ENGINEERING NEWS-RECORD

Leif J. Sverdrup—Civic honors for a general p. 89

A McGRAW-HILL PUBLICATION

E B POWER GS N
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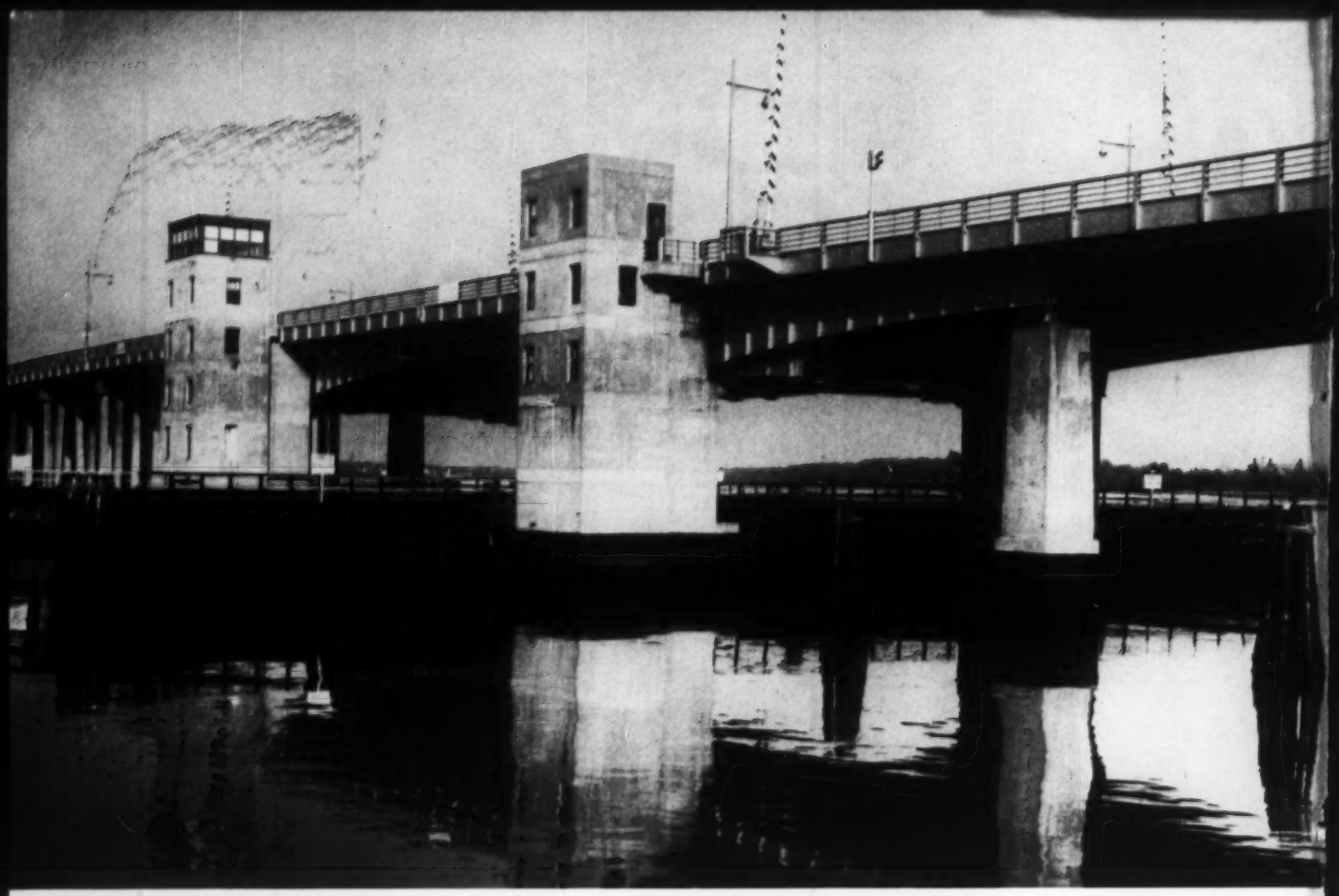
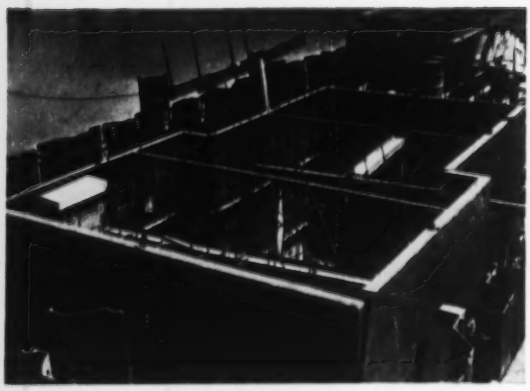


Protective scale which normally forms on the surface of wrought iron plates provides a long life additive for concrete substructures.

Bridge piers get low-cost protection against corrosion and spalling with Wrought Iron Plates



On new installations, wrought iron plates can serve in the place of forms for the concrete during construction.

Wrought iron pier protection plates stand up successfully to submerged and alternating wet-dry corrosion for extremely long periods of time.

The cost of such encasement is low in terms of protection for the concrete or other exposed structures. That's because wrought iron is such a reliable buffer against abrading or cutting action of water, floating objects and freezing and thawing.

We'd like to tell you more about wrought iron's saving in this service. Our booklet, *Wrought Iron for Bridge Construction*, contains illustrated case histories. Write for a copy. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

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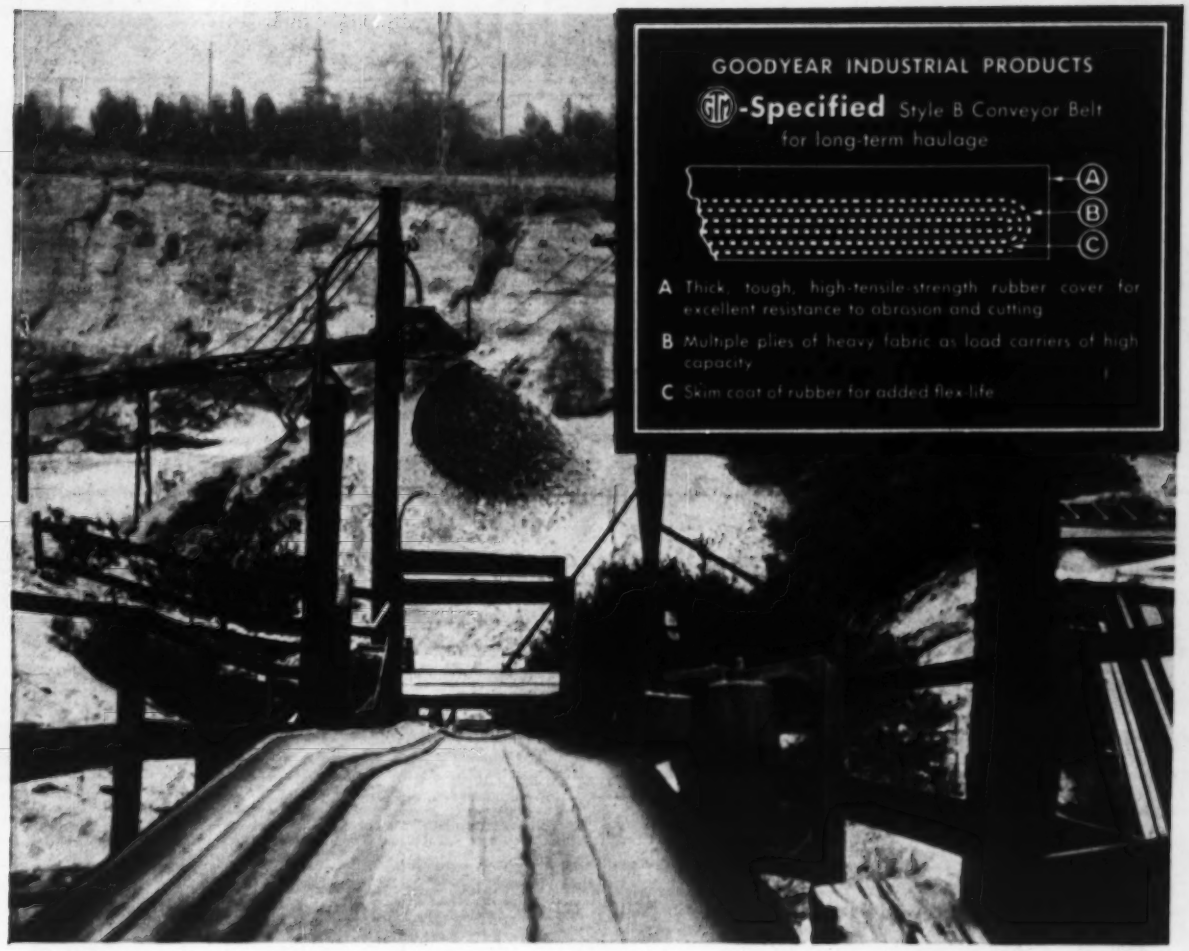
BYERS Wrought Iron Tubular and Hot Rolled Products

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS


GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified Style B Conveyor Belt
for long-term haulage
A
B
C
A Thick, tough, high-tensile-strength rubber cover for excellent resistance to abrasion and cutting
B Multiple plies of heavy fabric as load carriers of high capacity
C Skim coat of rubber for added flex-life

Served twice as long on rugged rock-pile job

Lifting 8-inch rock—at 350 tons an hour—up 125 feet to the crusher-mouth proved a belt-breaking job at this California quarry. Under the great weight, previous belts soon stretched beyond use. All failed in less than 4 years.

Then the G.T.M. – Goodyear Technical Man – made a recommendation: high-tensile-strength Style B Belt, constructed to resist abrasion and stretch under heavy loads. His belt lasted *twice* as long as its predecessor—with far less time out for adjustment. Its great success prompted the replacement of every other belt in the plant with Goodyear belts.

And that's only one of many problems where the G.T.M.'s solution has been a big time- and money-saver. To tap this knowledge and experience for *your* business, contact him through your Goodyear Distributor or write:

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Akron 16, Ohio

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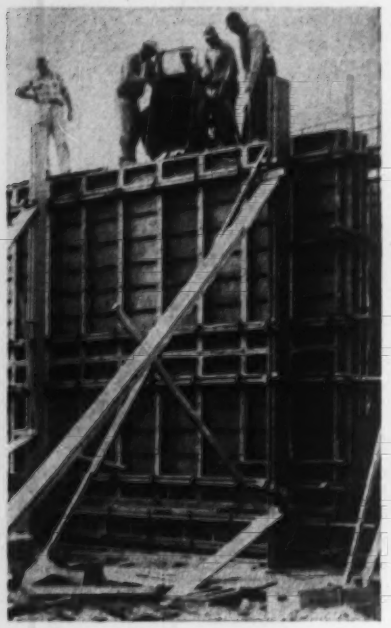
IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

Symons FIELD REPORT...



Pouring Costs Cut 25% with Symons Forms . . .

Joseph R. Farrell, Inc., Philadelphia, general contractor, saved more than 25% in pouring costs on the new Cardinal Dougherty High School through the use of Symons Forms. 5,522 feet of Symons Forms were purchased for the job, and were used more than eight times. A total of 50,000 square feet of forming was erected for the 1600 yards of concrete.

Contributing to the speed and economy of the pouring was the use of 2" x 12" strong backs. The strong backs were held in place by 12" standwall ties used as strong back ties to make the horizontal joints stay plumb for the 18 and 20 foot walls. The strong backs permitted continuous pouring of the foundation walls.

With your plans, our engineers will prepare a complete form layout, bill of materials, and make recommendations for the most efficient and cost saving method of forming.

Symons Forms can be rented with purchase option. Symons Clamp & Mfg. Co., 4265 Diversey Avenue, Dept. D-7, Chicago 39, Illinois.

Workmen strip forms while a new pour is started.

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ENGINEERING NEWS-RECORD

EIGHTY-THIRD YEAR OF PUBLICATION

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ENGINEERING NEWS-RECORD, Vol. 158, No. 14, April 4, 1957

Published weekly by McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. Publication Office, 99-129 North Broadway, Albany 1, N. Y. See panel below for directions regarding subscriptions or change of address. **Executive, Editorial, Advertising and Circulation Offices. McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y.** Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator. **Subscriptions are solicited only from persons with identifiable commercial or professional interest in construction and building. Position and company connection must be indicated on unsubscribed orders.** United States subscription rate for individuals in the field of this publication $6.00 per year; single copies 35 cents; foreign $20.00 per year, payable in advance. Second-Class mail privileges authorized at Albany, New York. Printed in U.S.A. Title registered in U.S. Patent Office.

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—on CRAWLERS
—on RUBBER

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These are just a few of the things that make the Northwest a better crane. A Northwest Man will be glad to give you the rest of the story.

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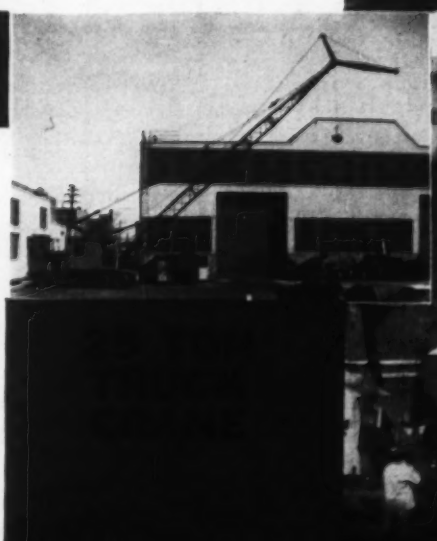

THE GREATEST COMBINATION OF PROVED ADVANTAGES EVER BUILT INTO A SHOVEL, CRANE, DRAGLINE OR PULLSHOVEL

NORTHWEST

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Available Now!

IMMEDIATE DELIVERY

USS AMBRIDGE *Standard* Steel Joists provide rigid, economical and light-weight construction suitable for any type of floor, roof and ceiling. The underslung and open web design provides for maximum head room and allows passage of pipes, ducts and conduits in any direction.

In floor construction, the ease and simplicity of handling this new-design steel joist reduces installation time to a minimum and permits other trades to begin work promptly. And for roof construction, AMBRIDGE Steel Joists cut the time required to put structure under cover.

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ASK FOR FREE BOOKLET: For detailed information about the time-and-money-saving advantages of using AMBRIDGE Steel Joists on your next job, get in touch with our nearest Contracting Office, or write direct to Pittsburgh for a free copy of our 36-page catalog.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

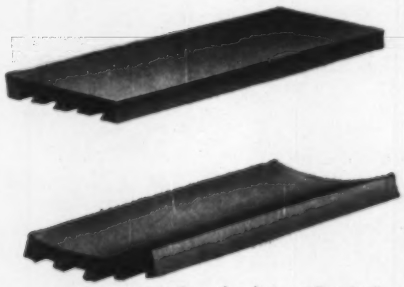
AMBRIDGE STEEL JOISTS

USS

UNITED STATES STEEL

Amvit CLAY LINER PLATES *resist abrasion*

provide smoother flow, added protection



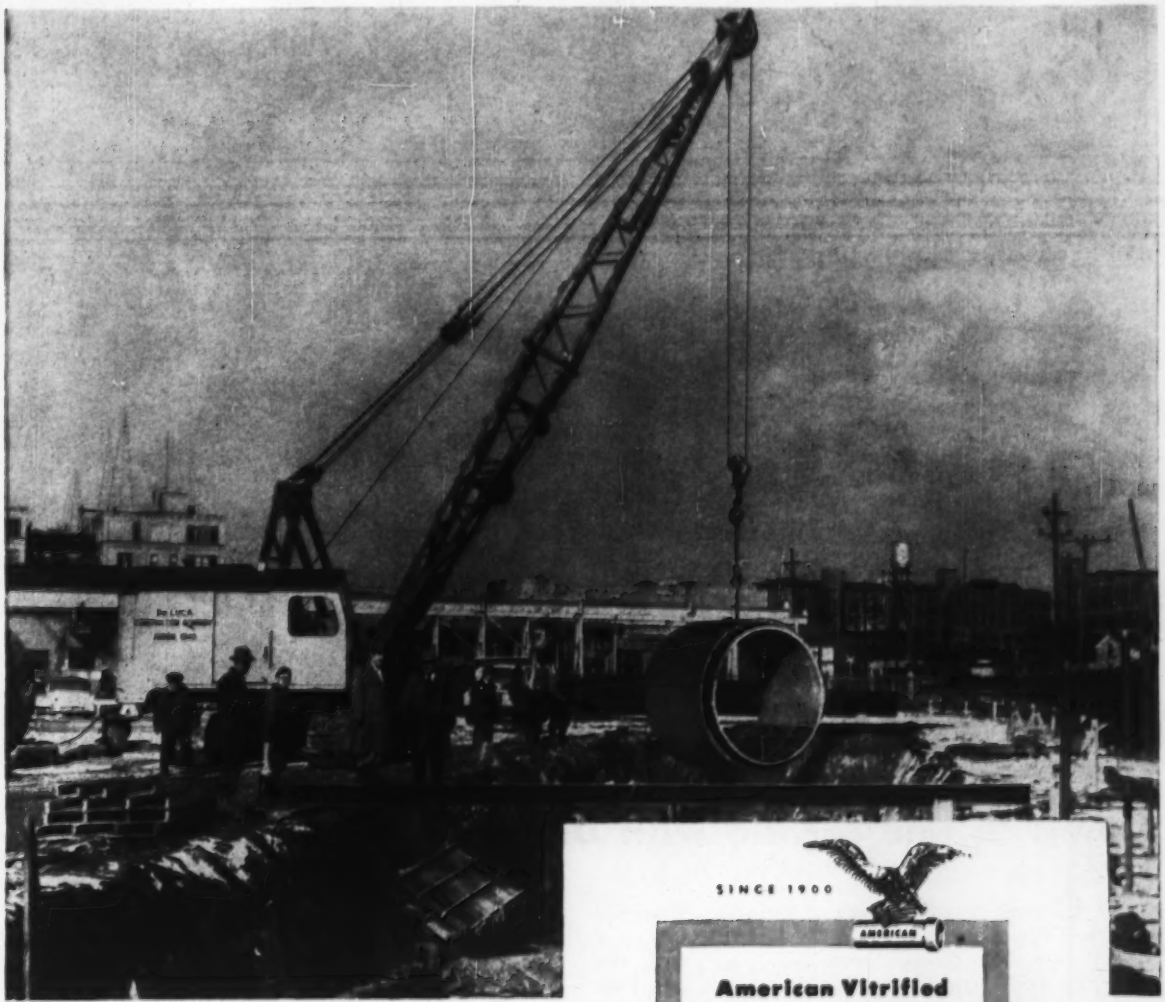
Standard size 9" x 24"
Other sizes upon request

● For *complete* protection of concrete pipe sewers, industrial sewers, culverts, acid vats, sewage treatment tanks, neutralizing baths and laboratory and industrial walls and floors choose and use *Amvit* clay liner plates.

They are specially manufactured to meet all application requirements which entail resistance to acids, alkalies and chemical reaction.

Amvit clay liner plates, hardened, glazed, smooth, acid-proof and durable, permanently bond and lock to masonry and concrete work. They install easily to concrete forms and are sized according to standardized specifications for uniform spacing.

For more information, write or call for our detailed booklet on Amvit liner plates. American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.



102" reinforced concrete pipe lined with Amvit curved clay liner plates being installed in a combination storm and sanitary sewer.

SINCE 1900

AMERICAN

American Vitrified Products Company

CLEVELAND, OHIO

MANUFACTURERS of: Clay pipe, flue liners, clay liner plates and concrete pipe.

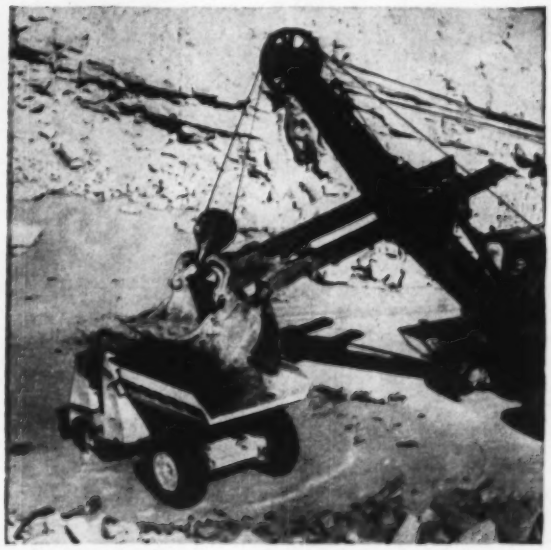
Plants Across the Nation...Brazil, Indiana • Chicago, Illinois • Cleveland, Ohio • Crawfordsville, Indiana • Detroit, Michigan • East Liverpool, Ohio Fenton, Michigan • Grand Ledge, Michigan • Lisbon, Ohio • Los Angeles, California • Milwaukee, Wisconsin • South Bend, Indiana • Uhrichsville, Ohio

Dump in *one second* with Dumptor®

On the above operation, Koehring Dumptor drives up to the hopper, body forward. Operator trips the body-release lever, and *gravity* tilts the 6-yard body 70 degrees. One second later the load is out, and Dumptor is on its way back for the next load. Because there is no waiting for slow-acting body hoists, *gravity-dumping* saves 15 to 25 seconds on every round trip. This adds up to a substantial increase in extra yards per hour. For instance — take a typical 1,000-foot haul, where you normally would make 16 trips an hour. By saving an average of 20 seconds dump-time on each trip, Dumptor gains 320 seconds, or 5.3 minutes more productive haul-time an hour. You get 17½ trips, instead of 16. This, alone, adds 9% to hourly production. What's more, there are no expensive hoist-replacement parts, or hoist maintenance time. *Gravity-dump* never wears out, never balks. You get the same one-second dumping *every time,* under heaviest loads, in all temperature extremes. Better check what this can mean in lower costs, and increased production on your hauling operations. Get the complete Dumptor story from your local Koehring distributor. *Call him today.*

Plenty of power on the haul – You get better than 6 h.p. for every ton of loaded weight when you haul with heavy-duty Dumptor. That's why it accelerates fast, pulls through soft ground, up ramps and grades with less shifting — climbs 24% grades fully loaded. When hauling heavy materials, extra horsepower means extra load-carrying capacity.

No-turn shuttle hauling – Dumptor solves problems of operating in tunnels, along overhead trestles, or narrow haul roads. There is no need to turn, because it travels with equal ease, power and speed in either direction. No-turn hauling offers a big production advantage, too. Every turn saved cuts 15 seconds off cycle time, increases output.

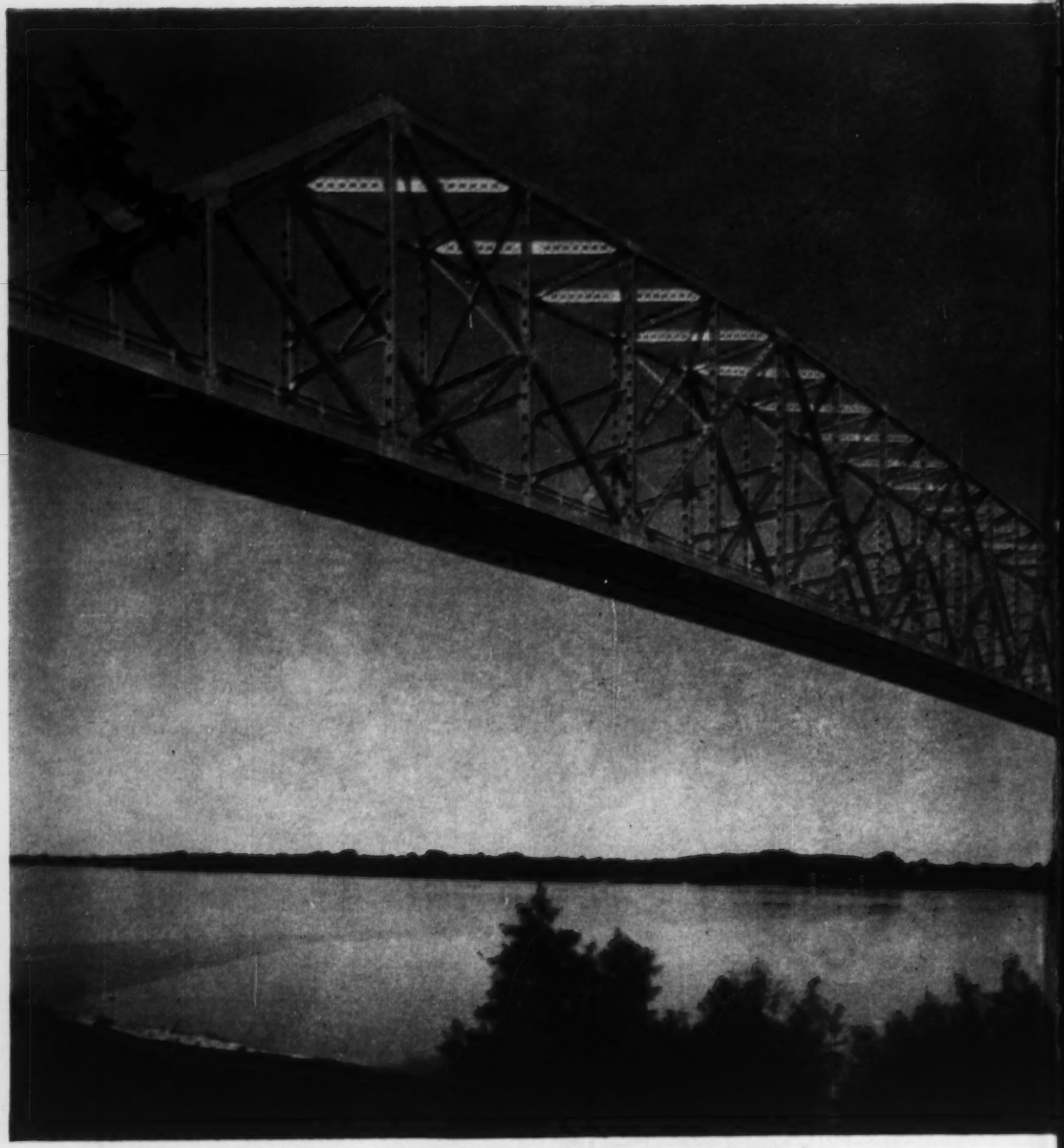


Easy-loading target – Big, 64 square-foot body opening permits loading Dumptor over the side or either end. This saves spotting time, reduces spillage. Heavy duty body is built for rock. Top edge and bottom are box-beam constructed. Sides and ends are rib-reinforced. In fact, Dumptor has a ton of strength for every ton of payload capacity.

Time-saver on stockpiling – Dumptor puts stockpiling on a fast shuttle-haul basis — eliminates turning on top of pile. Notice how instant dumping action kicks the load out over edge of pile — saves a lot of dozer clean-up. Free-swinging kick-out pan breaks load suction in wet, sticky materials, bolts down to floor when handling rock.

KOEHRING COMPANY, Milwaukee 16, Wis. Subsidiaries: PARSONS · KWIK-MIX · JOHNSON · KOEHRING-WATEROUS LTD.

In America's longest **two-span**



USS HIGH STRENGTH STEELS

—the big step forward in bridge construction

continuous through-truss bridge...

High Strength USS TRI-TEN "E" Steel reduces dead weight 400 tons

THIS imposing structure, the Shawneetown Bridge, straddles the Ohio River at Shawneetown, Illinois. Its total length is 3,200 feet. Each approach consists of a 150-foot simple truss, a two-span continuous deck truss and three units of three-span continuous beams.

The two main spans deserve your particular attention. Designed to meet navigational requirements, they are each 825 feet long—*the longest spans of their kind in this country.*

Because in spans of this length, dead-load stress is about 80% of the total stress in the main members, reduction of dead load is highly desirable and can result in real savings. For this reason, USS TRI-TEN "E" Steel was specified for the main spans.

Built with USS TRI-TEN "E" Steel, top and bottom chords, diagonal truss members, bottom laterals and other highly stressed members weigh only 80 to 85% of what they would weigh if built of structural carbon steel. As a result, the 2,350 tons of USS TRI-TEN "E" Steel used in the main spans eliminated over 400 tons of dead load.

The bridge was erected by cantilevering and these lighter trusses brought an additional advantage: reduced loads during erection.

• • •

Designers of steel structures, who have long sought to reduce dead load safely, have found in USS TRI-TEN "E" Steel an answer to their problem that is both practical and economical—particularly where long spans are concerned.

With a minimum yield point 50% higher than that of structural carbon steel (ASTM A7) in thicknesses of ¾" and less, USS TRI-TEN "E" Steel can safely be used in lighter sections to reduce weight and save steel. And these savings don't end with material costs. As proved in the many important bridges built with this stronger and more durable steel, lighter-weight structures mean lower freight costs as well as reductions in the size and cost of foundations. These savings, in some instances, have totaled as high as 15% of the cost of the structure.

Our engineers will be glad to show you how USS TRI-TEN "E" and our other USS High Strength Steels—USS COR-TEN and USS MAN-TEN—can be used to provide maximum strength, safety and durability with a minimum of weight and costs. Have you a copy of our new *"Design Manual for High Strength Steels?"* For your free copy, write on your company letterhead to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

The Shawneetown Bridge, Shawneetown, Illinois

Owner—Commonwealth of Kentucky
Designed by—Kentucky Department of Highways
Consulting Engineers—Sverdrup & Parcel, Inc., St. Louis, Mo.
Structural steel fabrication—Allied Structural Steel Companies

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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UNITED STATES STEEL

Reader Comment

Seattle Bridge Questioned

SIR—An ingenious method of financing a proposed toll bridge whose own prospective revenues are insufficient to finance it has been incorporated by the Washington legislature in the bill authorizing a second pontoon bridge across Lake Washington at Seattle.

The existing bridge is situated about 6 miles north of the southern end of the lake and affords almost direct access to both Seattle's business and industrial areas. Conversely it affords Seattle's business and industrial areas a direct approach to U. S. 10, the east-west road across Washington which is a constituent part of the national system of interstate and defense highways. It is four lanes wide and now with genuine congestion in the rush hours carries an annual daily average traffic of 33,000 cars per day.

Three and one-half miles to the north is the site of the proposed Evergreen Point-Union Bay bridge, opposed by Seattle but strongly favored by east shore development interests. It is not on the federal aid system, either primary or secondary. Considering its position and connections it is not surprising that efforts to have it put on the federal aid system have been unsuccessful. If built it probably would relieve the existing bridge of a small percentage of its present traffic but would provide far less relief than has been extravagantly claimed for it.

A year ago the Chicago firm of DeLeuw Cather and Co. was retained by the Washington Toll Bridge Authority, as a reputable and unbiased engineering firm without local interests, to study the situation and recommend the best location for a second bridge. Their recommendation was that the new bridge be parallel to and 250 ft north of the present one. It was their estimate that the parallel bridge would require a 20¢ round trip toll, Evergreen Point a 50¢ round trip toll.

"Substitute House Bill No. 205" would direct the Toll Bridge Authority to build the Evergreen Point Bridge unless it be found "not financially feasible". And the truly intriguing part of the measure is that, to prevent any such distressing discovery, the Toll Bridge Authority has been empowered to impose tolls on the traffic of the existing bridge to aid and assist the financing of what has disrespectfully been called "the real estate bridge", 3½ miles away!

The only remaining uncertainty, if one there be, is the national one. May a state legislature impose tolls on a bridge on the interstate system and use those tolls not to improve that bridge but to improve some other favored local bridge, 3½ miles away or 35 miles away? If it may, here is an engaging field for local enterprise in more states than Washington. If it may not, then alack and alas for the Evergreen Point bridge across Lake Washington.

HOMER M. HADLEY
Consulting Engineer,
Seattle, Washington

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

Cheap Runway Extension?

SIR: If the Fort Worth City Council can extend a 2,050 ft runway to 8,450 ft at a cost of $50,000 (ENR March 7, p. 33), the U. S. Department of Defense must spare no expense to hire these men to plan runway extension at all military airfields. In that way, I am sure the U. S. budget can be cut measurably.

MELVIN BERKOWITZ
Silver Spring, Md.
U. S. Navy Bureau of Aeronautics

EDITOR'S NOTE—Correct cost of the runway extension should have appeared as $500,000.

Revised Shape Factors

SIR—The article on the provisions of "American Standard Building Code Requirements for Minimum Design Loads" (A58.1-55) gives additional data and refinements that will be of greater value to engineers and local building code committees than the old 1945 version of the building code standard.

I was interested in the author's explanation of the reasoning involved in handling some of the revisions, especially that of shape factors. It is understandable that there would be reluctance on the part of the wind-load subcommittee to complicate matters by insisting on separate tables of velocity pressures and shape factors. As indicated in the article, the compromise was affected by making the wind-pressure table fit rectangular shapes by incorporating a 1.3 shape factor for rectangular shapes multiplied by the corresponding velocity pressure.

The use of the table for other types of shapes than those given in A58.1-55 would require that the wind pressures be multiplied by the required shape factor and then divided by 1.3 to cancel out the rectangular shape factor. Possibly, this might result in errors on the part of an engineer not familiar with the construction of the table, in attempting to apply the table to other types of shape factors.

HERBERT S. SAFFIR
Assistant County Engineer
Dade County, Miami, Fla.

Bigger Than in Texas

SIR: Your March 7 issue concerning the extension of a runway at Amon Carter Air Field at Fort Worth, Texas-fashion, states that this runway, when extended to 8,450 ft in length will be the longest in the southwest, with the exception of Carswell Air Force Base.

It appears that . . . the statement . . . is a little too inclusive. We presently have at Kirtland Air Field in Albuquerque, an east-west runway that is 13,774 ft in length. We hate to destroy the myth of Texas superiority, however are compelled to point out that factually it ain't so. Might we suggest that if there are any jets unable to land at Amon Carter because of short runways, they are welcome to land at Albuquerque.

ARTHUR W. BROWN
Industrial Manager
Albuquerque Chamber of Commerce

CALENDAR

Building Code Conference, St. Louis University, St. Louis, Mo., April 5 and 6.

American Welding Society, Hotel Sheraton, Philadelphia, Pa., Apr. 8-12.

Building Research Institute, sixth annual meeting, Drake Hotel, Chicago, Ill., April 15-17.

Western Concrete Pipe Association, annual meeting, Hacienda Motel, Fresno, Calif., April 18-19.

Sanitary Engineering Conference on Solids Handling and Anaerobic Digestion, Manhattan College, New York City, Apr. 24-26.

International Commission on Irrigation and Drainage, 3rd Congress, Sheraton-Palace Hotel, San Francisco, Calif., April 29-May 4.

Building Officials Conference of America, Inc., 42nd Annual Convention, The Jung Hotel, New Orleans, La., May 6-9.

American Water Works Association annual conference, Atlantic City, N. J., May 12-17.

12th Purdue Industrial Waste Conference, Purdue Memorial Union Bldg., Lafayette, Ind., May 13-15.

Air Pollution Control Association, golden jubilee meeting, St. Louis, Mo., June 2-6.

ANOTHER NEW "Euc" SCRAPER MODEL SS-18

...25 yards heaped

300 HORSEPOWER • TORQMATIC DRIVE

...high speed production over the long hauls

Consider this new Euclid for your earthmoving requirements. Designed for increased production on the long haul scraper jobs, the SS-18 combines power, speed and 18-yard struck capacity.

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For more details on this big high production scraper, contact your Euclid dealer... ask him to show you why *Euclids are your best investment.*

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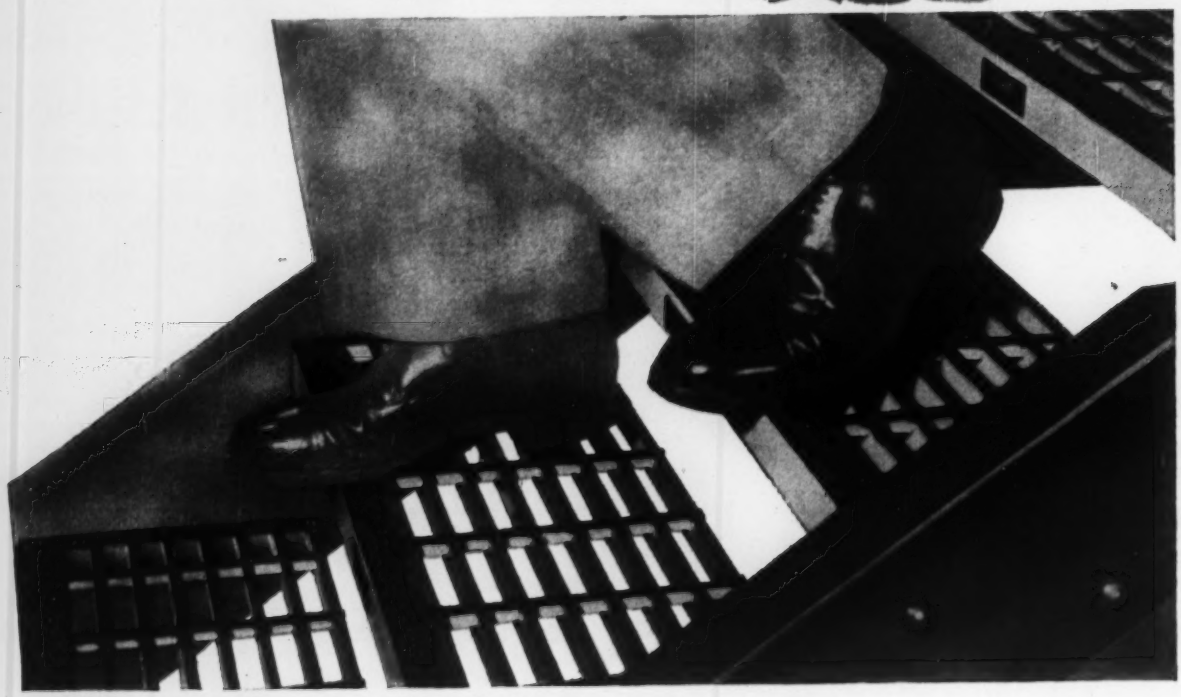

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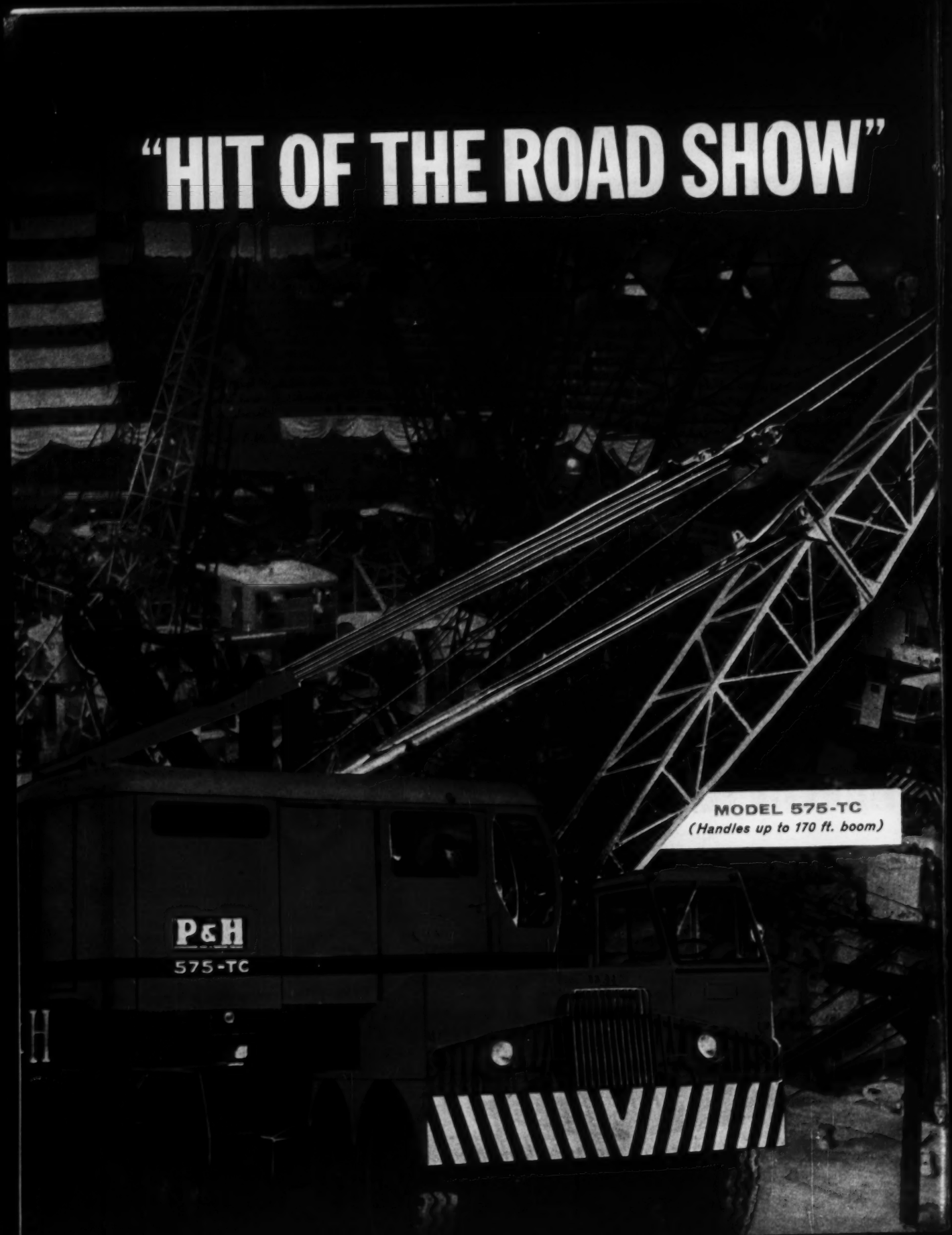

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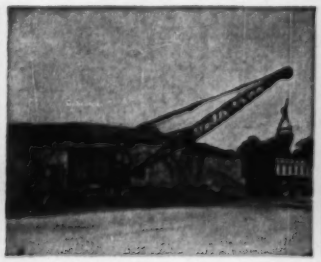

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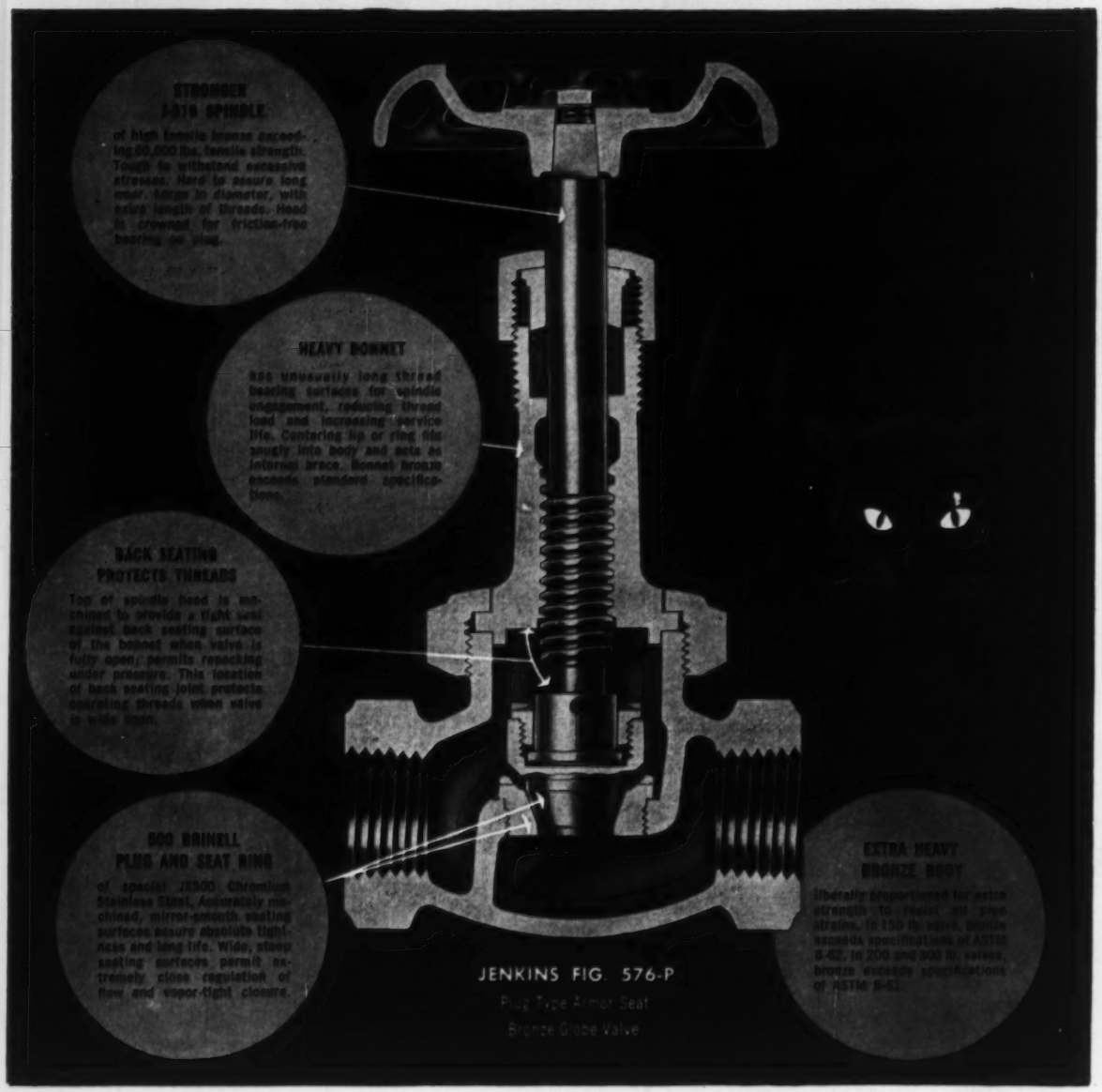
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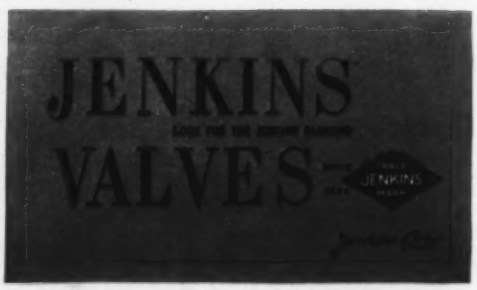

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ENGINEERING NEWS-RECORD

Vol. 158 No. 14 April 4, 1957

Number of copies printed this issue: 76,680

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Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Price 35¢ each copy except Annual Cost Issue. Semi-annual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in Industrial Arts Index and Engineering Index.*

THE CONSTRUCTION WEEK

ONE WAS NOT REJECTED—Those high low-bids that totaled $18 million more than the estimate on dredging of the South Cornwall Channel of the St. Lawrence Seaway were not all rejected, as reported in ENR Mar. 21, p. 21. S. J. Groves & Sons, Minneapolis, Minn., was awarded a $2.3 million contract for Section C of the project. Bids for Sections A, B, D, and E totaling over $30 million, were rejected as too high.

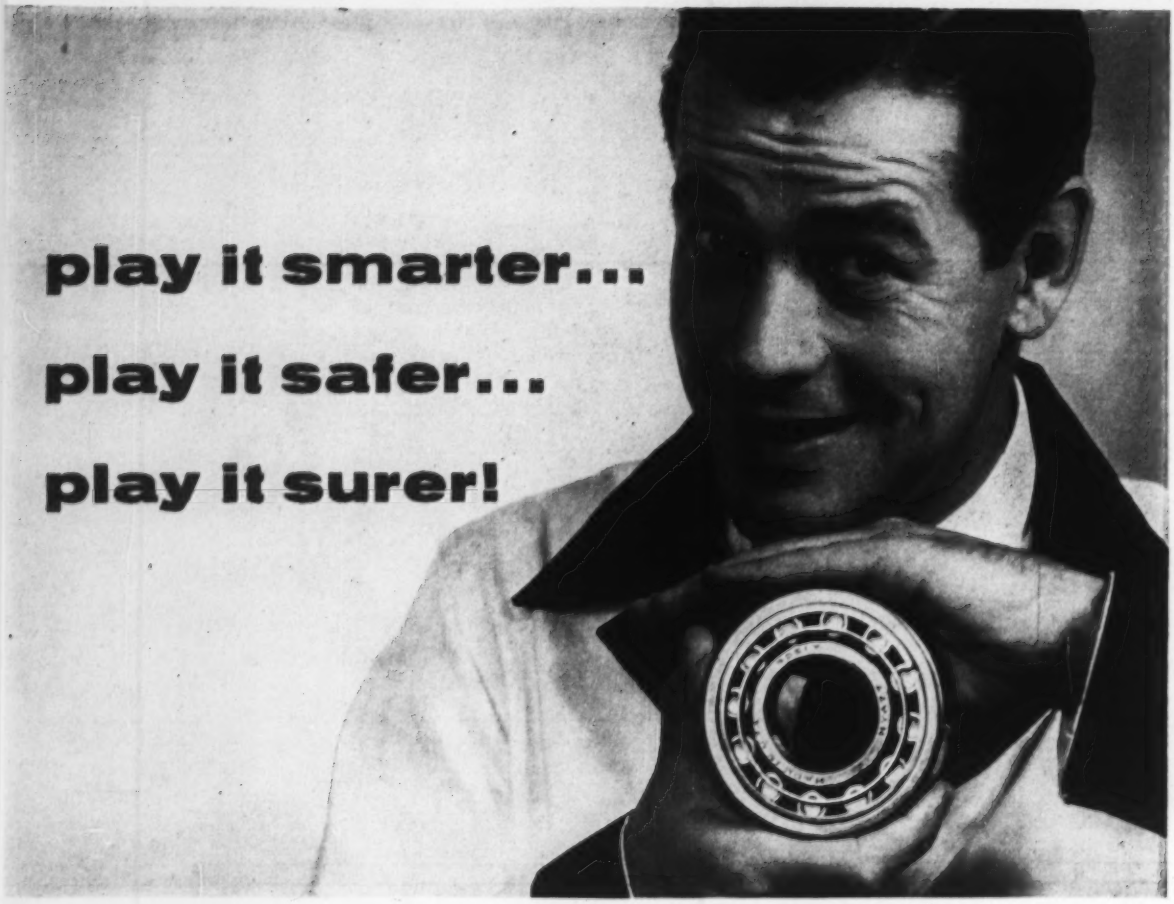
POLITICS DOESN'T BUILD BRIDGES—New York City's plans for $1 billion worth of bridges and their connecting roads—including the long-planned Narrows ($260 million) and Throgg's Neck ($110 million) suspension structures—are apparently shelved until the political atmosphere gets clearer.

Problem isn't expense—the U. S. would pay 90% of the cost of the approach roads, and the Triborough and Port of New York Authorities would pay for the bridges. What worries New York City's politicos is the number of voters who would have to be displaced to clear approaches to the two structures, and for new approaches needed if the George Washington Bridge over the Hudson River is double-decked. With state and city elections due next year, nobody in the city wants to get in the way of angry voters.

So New York's Mayor Wagner has called a meeting for this week—at which he's expected to tell highway officials that the program will have to be "deferred."

THE QUIET CITY—The spring symphony of hammers, concrete mixers and power shovels was muted in Baltimore this week. A work stoppage affecting an estimated 13,000 to 16,000 building trades workers shut down virtually every union shop construction job in the area, except the Patapsco Tunnel, where Merritt-Chapman & Scott has national agreements to meet any local scales.

COLUMBIA RIVER DIVERSION—With direct negotiations between the U. S. and Canada over Canada's plans for Columbia River waters (ENR Aug. 23, 1956, p. 21) now under way, Canada has announced it is prepared to assist the Province of British Columbia in the development of Columbia River power to the tune of $300 million. In making the announcement, Canadian Fisheries Minister James Sinclair was hopeful that it "will act as a spur to negotiations." He also commented that this was further evidence that Canada has the wherewithal to go ahead alone if necessary.



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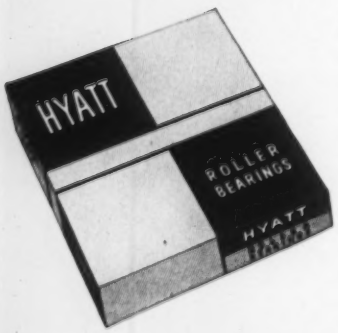

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WASHINGTON OBSERVER

- **Tighter labor laws considered**
- **New chairman due for Joint Board**
- **School aid boosters need miracle**
- **Civil works get a second chance**

- **Full disclosure of welfare fund receipts and expenditures is one bit of union legislation** that looks most possible as the McClellan committee winds up the first phase of its hearings. Such funds are wide-spread in the building trades.

  Talk about tougher regulatory legislation already is cropping out. Chairman McClellan himself has suggested some new laws that may be needed.

  Detailed public accounting of spending of dues collected is one idea. Others include requiring free elections with a secret ballot and extending the antitrust laws to cover some union activities.

  But getting this kind of law passed is not likely in this session of Congress. And anything that could be labeled "anti-union" would have a tougher fight next year, with elections only months away.

  It's too early to tell what impact teamster troubles may have on their close relationships with some building trades unions—the carpenters, operating engineering, and the laborers, particularly. No big change is foreseen soon, and it may be that nothing significant will happen before the teamster convention this fall.

- **Successor to John Dunlop has been picked to head up the National Joint Board** for the Settlement of Jurisdictional Disputes. The man to take over when Dunlop leaves in August is Oscar S. Smith, who is now director of personnel for the Atomic Energy Commission. Official announcement may not be made for some time, but Smith is already being broken in on the duties of the job. He was formerly with the NLRB.

- **Supporters of federal school construction are trying to work a miracle.** The strategy and tactics: Meld the Administration and Democratic programs so that no partisan tag will invite opposition, and keep the integration issue out of the program. That's a big order, and supporters say they can only be slightly optimistic.

  Members feel they have solved most differences: The Democratic provision for $700 million a year in aid will be scaled down. There is also likely to be compromise as to the length of the program—the Administration's four-year program vs. the Democratic six-year program. Another target for compromise will be the formula for allotting aid.

- **Congress is making another try to authorize a civil works program.** The Senate has voted for a $1.5 billion in rivers and harbors bill, and the House will vote before the session end.

  Whether President Eisenhower will veto the legislation, as he did last year, is still unanswered.

  He did it last year because Congress voted for some projects that had not been approved as to feasibility by the Corps of Engineers. And the Senate's measure this time also includes seven projects the Administration opposes and five lacking reports from the Army Engineers. Some of the proposals that President Eisenhower objected to last year have now received Engineers' approval.

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The Soil Conservation Service is rejuvenated . . .

Ex-Congressman Hope . . .
pushed Conservation's watershed program through in 1954

Congressman Poage . . .
broadened the law and put it in workable shape in '56

Secretary Benson . . .
is a powerful spokesman for SCS's $6 billion program of small dams

SCS Breaks Into the Big Time

In 1953, when the new Eisenhower Administration put through a reorganization of the Soil Conservation Service there was much trepidation among some SCS supporters—particularly some of the agency's old-time employees in the seven regional offices.

Aside from employee fears about their own futures, owing to abolition of the regional offices, the opponents of reorganization professed to see a dark conspiracy afoot, ultimately to strip SCS of its identity and submerge it in some other Agriculture Department agency.

Now, four years later, it seems fairly clear that the anxieties were ill-founded. SCS with all its state offices reporting directly to Washington is bigger than ever, spending more money than ever, and is now moving into a long-range, nationwide water engineering program that will involve considerable sums of money.

The program, voted by Congress in 1954 and amended in a major way in 1956, is known fairly widely by the formal name of "Watershed Protection and Flood Prevention."

What is not at all widely known is that by the mid-60's, according to unofficial estimates of service planners, it may involve outlays of as much as $100 million a year for dams (mostly very small) and related structures in U.S. watersheds.

In these days of rampant talk about federal economy and budget-cutting and inflationary fears, the Soil Conservation Service people are naturally a little nervous about tossing around a lot of big figures, but from sources outside the Agriculture Department, ENGINEERING NEWS-RECORD has learned that officials are thinking in terms of a 40 year program that might involve as many as 4,000 feasible projects and as much as $6 billion.

With this kind of money at stake, the watershed program is worth examination in detail as to history, philosophy and practice.

I. A Program Is Born

Viewed from a fresh perspective, it is with reason that Assistant Secretary of Agriculture Ervin L. Peterson has been saying in recent public appearances that:

"All factors considered, the Department of Agriculture can make claim to being the principal conservation agency of our federal government. In making this statement I in no wise deprecate the important work of our sister agencies applicable to water conservation and use."

Not the least of the factors that Peterson talks about is the newest one—the watershed program—which former Rep. Clifford Hope of Kansas managed to get through the 2nd session of the 83rd Congress (against strong opposition) just before he retired.

By comparison with what was to come, it was a rudimentary piece of legislation, merely authorizing Soil Conservation Service to cooperate with local agencies in development of watersheds of 250,000 acres or less which would include no single project providing more than 5,000 acre-ft of storage capacity.

"Works of improvement" were, the original law specified, to be for flood prevention—including structural and land-treatment measures—or for agricultural phases of conservation, development, utilization and disposal of water.

In 1956, Congress amended the original act to make it much broader and more readily workable. This was on the initiative of Rep. W. R. Poage, a Texas Democrat. As things stand at present, these are the principal features of the law:

- Watershed plans in which the federal contribution to construction costs do not exceed $250,000 may be authorized by the Department of Agriculture without other Executive or Congressional review, provided no structure of more than 2,500 acre-ft capacity is involved.
- Multiple-purpose development is authorized, perhaps the most significant of the 1956 changes. This means municipal and industrial storage may be added to a project, although such costs must be borne 100% by the local interests.
- Total federal financing is provided for flood prevention features of a project, but local interests must provide and pay for land easements and rights-of-

way and show clear title to water rights that may be involved.

• Irrigation, drainage and other agricultural water management costs are to be paid by local interests, proportionate to their share of identifiable direct benefits.

On flood control-agricultural water management projects, local interests may have federal engineering help or may employ private engineers to design, prepare and award contracts and supervise construction; where municipal and industrial storage is involved, use of private engineering talent is mandatory in most cases.

• Congressional and inter-agency review (by the Department of Army and Interior Department) is required if any unit in a project involves more than 2,500 acre-ft capacity or potential federal construction outlay of more than $250,000.

II. A Warm Reception

Reaction to the program was warm, in more ways than one. There was the response of the Army Engineers who—a Presidential blessing notwithstanding—testified against the legislation in 1954 as it proceeded through Congress.

The Engineers saw the new program as an encroachment. There are still bitter feelings, and they are likely to grow more bitter.

Says ex-Congressman Hope, "What disturbs me is the past and continued efforts of the Corps to sabotage this program. I do not want to be unduly critical of this organization. They are great engineers. I sometimes wonder if they are not even greater lobbyists.

"Never in the past have the Army Engineers paid any attention to small watersheds. Only now when the general public has become so greatly interested have they become interested. My interpretation of their present attitude may be wrong, but it appears to me that they are opposed to small watershed programs generally—but if we are going to have them, they insist on doing the job."

On the question of lobbying, from an impartial viewpoint there is much to be said on either side. It is undeniably true that the Engineers have powerful friends on Capitol Hill in the Appropriations and Public Works committees. But it is also true that the Agriculture Department, even when its secretary is under sharp attack as Ezra T. Benson has been from Democrats, is not adverse to or ineffective at the art of discreet lobbying for its programs. The department certainly has a sizable core of strength in Congress at all times.

Besides that, Mr. Hope and his colleagues—and, later, Congressman Poage and his colleagues—had grassroots support unlike anything the engineers could muster: immense national farm organizations, such as the American Farm Bureau Federation, and a little-known Confederacy of the Soil Conservation Districts, which are organized in some 2,700 counties—and which understandably have a terrific political potential.

It was for the grassroots people that the watershed program was devised. Indeed, because a local or state agency is required to initiate and carry through on the projects, the soil conservation districts are generally the originating sponsors.

Now, with the addition of probable allies in municipal government (industry has not responded to the opportunities of the program), the Congressional farm bloc seems to have put the program beyond reach of its critics, although Mr. Hope charges the Corps is still sniping at it—surreptitiously in Congress and in the Bureau of Budget and other agencies of the Executive Branch.

Inevitably, conflicts will come. For example, irrigationists in the arid Southwest are fearful of upstream impoundment.

The Soil Conservation Service takes the stand that watershed development cannot be undertaken where the local interests don't want it—that is, initiative must originate at the local level, and SCS deals only with public bodies which are legally recognized by state authority and are financially able to operate and maintain projects.

A current dispute throws SCS athwart the Corps of Engineers on the upper Susquehanna River in New York State. Local conservancy interests are clamoring for the small watershed treatment, in preference to the Corps' customary big-dam flood control treatment.

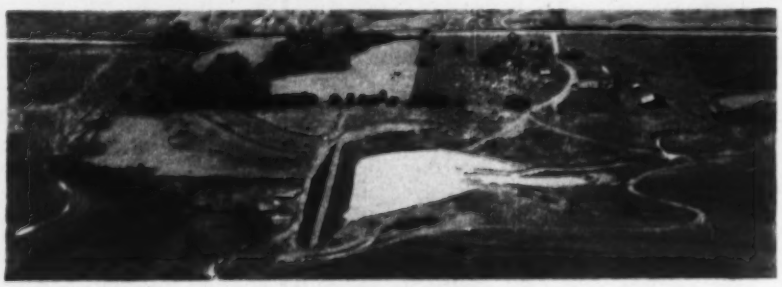
On details of this argument, the Soil Conservation Service is quiet. But one service official says: "There's likely to be a lot of this type of thing, particularly in the East where the valleys are narrow and the best land is bottomland that would be inundated by big dams."

Another service official chimes in: "This program is so popular that some of our friends out in the country go around making all sorts of claims for it, some of them exaggerated a bit. Naturally, we have no control over the claims and neither can we be responsible for them."

By now, there's no doubt that the program is, in fact, extremely popular. This is the other side of the warm reception: By Feb. 1, 1957, the Agriculture Department had requests for assistance in 629 projects in 46 states (all but Maine and Rhode Island). Of these 629, 246 in 45 states have been approved for detailed planning. And by this week, 35 projects in 23 states had reached the stage where work has begun on some or all units, or where final departmental approval had been given to proposed contracts.

In these first 35 projects approved, the federal government will pay an estimated $20 million, or 54% of the total estimated cost of $37 million—about $1 million a project.

The thing to remember: The pro-



No Single Dam Will Be Very Large . . .

First project on which work began, in October, 1956, was Delaware's Bear Hole watershed. Improvement there involved only channel work, no major structures, and it should be completed sometime this summer.

Others approved show a wide range of variation as to the size and detail. For instance, the Wray Watershed Project in Colorado involves only 2,386 acres and the Oak-Middle Creek Tributaries Project in Pennsylvania embraces 240,000 acres spread out over four counties.

The Harmony Creek Project in Iowa will have six structures within its 3,100 acres. Earthen dams, ranging from 26 ft to 55 ft high, will involve only thousands of cubic feet of fill, cost from $13,000 to $37,000 each—or $132,000

gram is in its infancy and the first batch of approvals have been slow coming. As experience piles up, and with the law now broadened, they will be coming faster in the future.

III. The "New Order"

As with all new programs, the spending starts slowly, builds up. The uptrend has set in with the SCS watershed program. In fiscal 1957, it got $17.5 million for the program; in fiscal 1958, the year beginning next July 1, President Eisenhower asked Congress for $25.5 million for continuation of the program.

In '57, the $17.5 million represents approximately 17% of the service's outlays; in '58, the requested appropriation accounts for 23%.

Will this program change the character of the service? Not basically, say the service officials. But as the watershed program gets bigger and bigger, SCS will be compelled to pay proportionately more attention to engineering and attendant problems.

The controversial reorganization act of 1953, instead of shrinking the service, has acted to make it bigger. Besides the watershed program which followed, SCS was given responsibility for Agriculture work in river basins and for the Great Plains program of guidance for and assistance in soil and water conservation.

The service is growing. It had 888 permanent employes two years ago; this year, nearly 1,500; next year, according to present plans, more than 1,800.

The controversy about the 1953 reorganization is slowly dying out. Some oldtimers still grumble about doing away with seven regional administrative offices—it impaired efficiency of fiscal, personnel and procurement operations, they say. But one, after reciting those complaints, said recently that service is more prompt "and possibly a little better" under the new setup where state offices are responsible directly to Washington.

Since its birth in depression days, as "the erosion service," SCS has been pushing toward the frontier where, by act of Congress, it finally has arrived. Hugh Bennett, first chief of the service, spent years preaching the doctrine of the watershed approach to basic conservation of water and soil. In 1936, Congress gave Mr. Bennett's agency authority to undertake 11 major watershed development projects. Work on these is still not complete.

In 1953, to demonstrate the need for the newest program, Congress authorized 58 smaller watershed "pilot" projects—largely different from the present new crop only in the financial arrangement whereby the SCS did all the work.

(They were scheduled to be completed by 1958, but now SCS thinks it may have to have an extension to 1960 or 1961 on the last of them.)

About the time that Secretary Benson reorganized SCS, Robert M. Salter, Hugh Bennett's successor as chief, asked to be relieved of his command job. Research Scientist Salter went back to his old job as chief of water and soil research, a post he kept until his death little more than a year ago.

Even the oldtimers who resented reorganization generally applauded the choice of a successor to the top job—

Administrator Williams . . .

brings the service a civil engineering training from a start in the CCC

Don A. Williams, a veteran of the service who started in 1935 as a Civilian Conservation Corps camp superintendent.

Williams, a civil engineer who graduated with honors from South Dakota State College, has made a specialty of water and irrigation work.

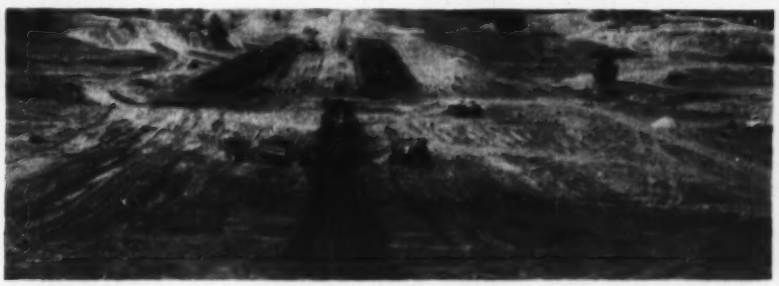
Apparently it was coincidence, although fortuitous coincidence, that Engineer Williams went to SCS' top job just in time to oversee its activities as it moved toward its most dynamic phase with the accent on engineering works.

What is happening is not so much a new philosophical approach as a jelling of a national philosophy. Don Williams sums it up like this: "Even the most casual examination of controlling watershed factors points the unmistakable direction in which we must continue to move in watershed treatment and management, and why the local-state-federal approach we have undertaken holds so much assurance of satisfying results.

"Water is the key to any watershed development, but water development and management cannot be separated from management and use of the land on which the water first falls as rain or snow—the watershed."

There still are, and will continue to be, arguments about the merit of the upstream, small watershed approach. But it looks like it's here to stay for a long time. Within the last two years, at least 26 states passed new laws for the specific purpose of complying with various regulations embodied in the watershed act passed by Congress.

And, just to show how things are going, the Oklahoma state legislature recently, at the height of the furore about big government spending, petitioned President Eisenhower, Secretary Benson and Don Williams for a "realistic reappraisal" of the SCS budget for watershed development—and a lot more money.



. . . But It's Engineered and Contracted Work

in total. Principal spillways for these projects will range in size from two square ft to 12 sq ft.

The average watershed size that SCS has dealt with thus far is about 77,000 acres. In this scale, Harmony Creek is small. On the upper half of the scale is, for example, the 172,525 Big Wewoka Creek project in three Oklahoma counties. It envisions 37 structures with total storage of 43,862 acre-ft. Dams will range from 25 ft to 51 ft in heights.

First to get in line for municipal water storage under a small watershed project was Cameron, W. Va., which is buying 56% of storage space in one of the seven dams in the Upper Grave Creek Project. The other six are tagged strictly for flood prevention.

Low Bid High

Tough excavation job pushes award $1 million over fund allocation

An extremely difficult side hill excavation job, a record length welded girder bridge and a bid that was more than $1 million over the allocation last week made big news of a $6.3 million highway contract awarded to Guy F. Atkinson Co. by the California Department of Public Works.

The site of the work is a 4.4 mi stretch of freeway on U. S. 101 in northern California—a bypass of the famous redwood groves which conservationists successfully fought to protect during consideration of the freeway.

The side hill cut includes 1.4 million cu yd of excavation up to 450 ft deep, with severe limitation on haul roads. The bridge has a 275 ft main span which makes it the longest welded plate girder structure in California, and one of the longest in the U. S.

In spite of the high bids, the State Highway Commission voted a $1,121,361 addition to the original allocation to enable award of contract. Highway engineers who recommended the award explained that about 50% of the total overrun was in roadway excavation.

"The project is entirely on new alignment and in very difficult terrain," the department noted, "which will make the grading a very expensive operation." A cut at the beginning of the project involves 1.4 million cu yd of difficult excavation. No haul roads can be developed on state park property outside the highway right of way. This cut requires construction of a detour in the stream bed for traffic on the redwood highway and as traffic must be taken off the detour before highwater, the contract requires completion of this large cut by Oct. 15, 1957.

"If the cut is not completed by Oct. 15, any remaining excavation must be deferred until the second construction season and the contractor will be required to restore the detour in the river at his own expense. The grading operations involved are complicated and expensive, are subject to a very tight schedule requiring exact planning and are subject to a wide variance of opinion in estimating.

"Failure to complete the large cut at the beginning of the project would require abandonment of the detour in the river and restoration of the detour in the second construction season. This would delay all succeeding operations and prevent completion of the project in the second construction season, extending completion into the third construction season. An early start on construction is therefore imperative."

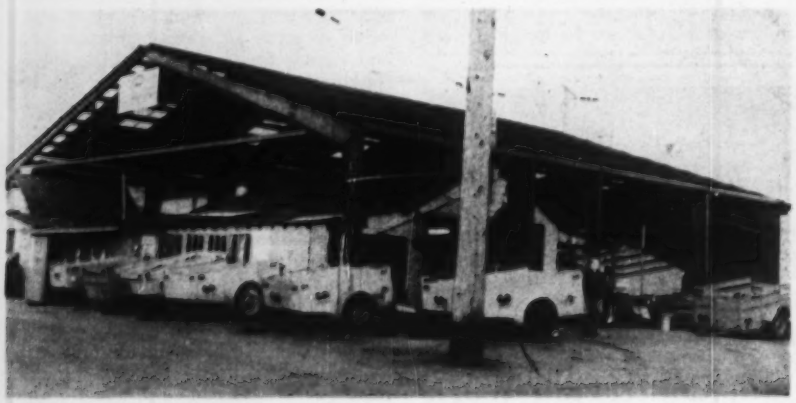
The side hill cut will be 450 ft at the deepest point and about 100 ft wide at the thickest.

There will be seven benches, 20 ft wide, to prevent slides.

For the roadway excavation totaling 2,810,000 cu yd low and second low bidders Darkenwald Construction Co., Inc., and Harms Bros. of Sacramento both bid 69¢ per cu yd. However, in the overhaul item involving 55.4 million station yards, the Atkinson bid of $.004 per cu yd, $221,600, compared to a Darkenwald-Harms offer of $.008 or $443,200.

The bridge is one of four on the job. It will cross the Eel River with span lengths of 110, 170, 275, 170 and 159 ft, for a total of nearly 890 ft. The girder depths will be 180 in. at the haunch and 102 in. in the middle. A total of 1,200 tons of structural steel will be used, mostly A7, although welded girder webs will be A373 and flanges will be A242.

The Atkinson firm's bid showed a price of $730,000 for the structural steel for the bridge compared to an offer of $544,939 by Darkenwald-Harms second lowest bidder for the whole job at $6,497,081.



New Plant Erected Over Old Building

To meet the owner's stipulation that a new building be built on the site of an existing plant without interrupting production, Hallidie Builders, Seattle contractor, simply erected a standardized building over and around the old one.

The steel rigid frame of the new 14 ft high, 70x100 ft structure was erected first. Then the roof, exterior masonry walls and 6 in. thick concrete floor were completed. Croft Trailers, Inc., of Tacoma, continued to operate in the old building until it was torn down.

Cost of the new building was about $5.00 per sq ft.

Detroit Water

Consultants take area-wide look, the situation remains unresolved

In an attempt to bring some order to water supply planning for the Greater Detroit area, the National Sanitation Foundation, a privately supported organization at the University of Michigan, last week released a report to officials of the six counties involved. The report, by consultants Louis Ayres of Ann Arbor, Richard Hazen of New York and Abel Wolman of Baltimore, throws some much needed light onto the advantages of a central water system for the area, but it does not present a clear cut plan of action. Indeed, initial reactions to the report by local newspapers and some public officials indicated resumption of a long-standing squabble between the city of Detroit and Wayne County to the south.

At present, Detroit is serving itself and portions of Wayne County and Oakland and Macomb Counties to the north, 305 sq mi in all, through a single intake on the Detroit River at Belle Island and three filter plants (see map in ENR Dec. 20, 1956, p. 30).

Two years ago Detroit served notice that Wayne County would have to supply its own water by 1970, then last year reversed itself and talked about a central system to serve the entire 1,600 sq mi metropolitan area. Apparently unconvinced, Wayne County shortly thereafter decided to proceed with construction of a 150 mgd independent supply (bid calls are almost ready), and authorities in Oakland and Macomb Counties looked seriously toward an independent supply from Lake Huron.

Detroit's present capacity is 915 mgd, which can be increased to 1,375 mgd at the existing plants. Maximum daily

demand in the proposed service area is 700 mgd (of which Detroit serves 650 mgd) and is estimated at 885 mgd, 1,250 mgd and 1,600 in 1960, 1970 and 1980, respectively.

• **Four plans presented**—The consultants present four possible plans. Plans A, B and C envisage expansion of Detroit's present system first. When needed, new supplies would be drawn from Lake Huron under Plan A; from just above Belle Island or Lake St. Clair under Plan B; and from a deferred Wayne County project under Plan C. Plan D calls for immediate construction of the Wayne County project (as is exceedingly likely at any rate) and later expansion of the Detroit system.

Capital costs for the four plans when all are completed (by 1975) are $142 million, $125 million, $114 million and $105 million, respectively, with Plan D requiring larger expenditures in the early years. These costs exclude certain distribution system costs that are common to all plans. Including operation and maintenance but excluding common system again, costs of water per million gal in 1980 are projected to $135, $118, $108 and $101.

While attractive costwise, the Wayne County project under Plan D was not viewed enthusiastically in the report due to its location below several major sewage treatment plant and storm water outfalls. This is in spite of the extensive report by the Hazen & Sawyer consulting firm on the lower Detroit River (ENR Dec. 20, 1956, p. 30) and the fact that Mr. Hazen was an author of the current report. It is understood that Mr. Hazen feels the latest report may have been worded unclearly on this matter; he remains four-square behind the reliability of lower Detroit River water.

Messrs. Ayres, Hazen and Wolman come out unequivocally for a centralized water system for the area, under either Detroit or a metropolitan district. Their report makes no choice among the various supply plans and is also silent on how the cost of the plans should be apportioned among the users.

Help for Housing

FHA downpayments are pared; Congress makes plans for new aids

Congressional efforts to stem the decline in housing starts began to take definite shape last week.

After voting against higher interest rates for home loans guaranteed by the Veterans Administration, the House received with general approval first reports of a committee bill that would create a substitute Federal Housing Administration program for veterans and pump more money into the mortgage market.

When Congress rejcted the Administration plea for higher VA rates, housing chief Albert Cole cut his estimate of housing starts for the year from 1.1 million to a doubtful 1 million. A few days later, the Administration reduced downpayment requirements for FHA insured loans to the legal minimums of 5% on the first $9,000 of house value and 25% on any amount in excess of this figure. Requirements had been set at 7% and 27%, respectively, since 1955.

More important than these moves is legislation Congress now is drafting.

The housing subcommittee of the House Banking Committee has put together a much-compromised bill that would:

• Provide an increase of $1.65 billion for advance commitments and purchases of FHA and VA loans by the Federal National Mortgage Association (Fannie Mae), to ease the tight mortgage market.

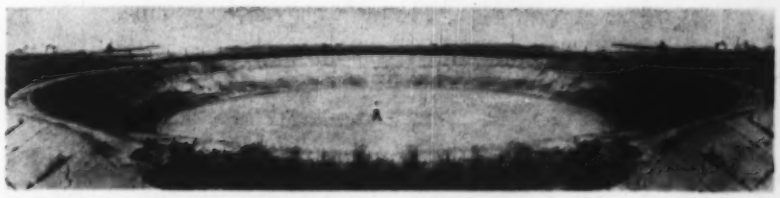
• Establish an FHA veterans' program that would fix downpayment requirements for GIs at 2½% of the first $9,000 and 5% of the remainder, at the same time excusing veterans from payment of the ½% insurance premium on these FHA loans.

By comparison, non-veterans' downpayments would be at least 5% of the first $9,000 and 20% of the balance—somewhat more than the "discretionary" minimums proposed to Congress by the Administration a month ago.

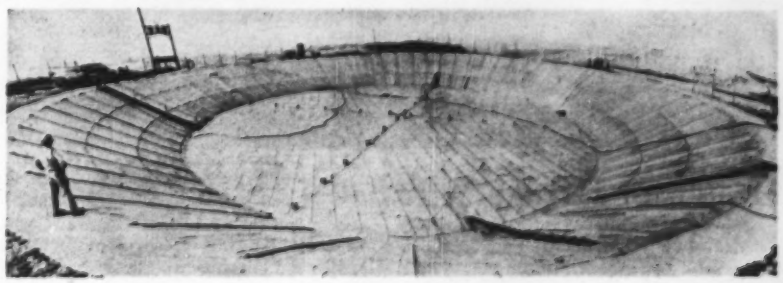
The housing subcommittee bill would also authorize investment of $1 million from the World War II National Service Life Insurance in commitments or purchases of the special FHA loans proposed for the FHA veterans' preference program.

The insurance money, which consists of premiums paid by GI policy holders, now is used for general expenses of the government. The President has threatened to veto any bill that would divert any portion of this money from the Treasury.

Aside from this controversial provision, the bill's biggest boost for a depressed mortgage market is an additional $1.1 billion of Fannie Mae authority to buy—and make advance commitments to buy—FHA and VA mortgages. The bill would force Fannie Mae to purchase these mortgages at not less than par.



Old Concrete Reservoir . . .



. . . Gets Shining New Lining

Stainless steel lines a 2,000,000 gal open reservoir that will hold ammonium nitrate for Hercules Powder Co. at its Hercules, Calif., plant.

A 200 ft dia concrete bowl unused since World War I has been reconditioned for use with a shining steel lining, highly resistant to corrosive action of the chemical to be stored.

Over 124,000 lb of 14 gage type 304 stainless steel went into the lining. Shipped from U. S. Steel's Vandergrift, Pa., plant, the sheets were prepared for welding in California by impression of rib-like expansion joints.

Welding on the job was done by Consolidated Western Steel Division, doing 3½ miles of electrode welding.

All welded lapped seams were vacuum tested.

Fish Troubles

Tacoma wins round at Mayfield, fight still on

Gov. Albert Rosellini of Washington State on March 22 signed into law a bill which permits Tacoma City Light to resume construction of Mayfield Dam on the Cowlitz River, but several problems need to be solved before work actually can be resumed.

The law removes from a 1909 Waterworks Act a prohibition on cities from interfering with public navigation by the construction of dams on streams such as the Cowlitz. An earlier court decision held that this provision applied to Mayfield Dam.

Tacoma awarded a $10.9 million contract in 1955 to the L. E. Dixon-Arundel Corp. for construction of the dam. Work has been hampered by court action, however, and was brought to a complete halt last fall when the State Supreme Court held the city could not condemn a state fish hatchery which would be flooded by the dam.

Tacoma tried to persuade the legislature to pass a bill enabling the city to condemn the hatchery, but was unable to muster enough votes. It still can build the dam but would have to reduce its height from 185 ft to a maximum of 120 ft, creating a reservoir falling just short of the hatchery.

Tacoma officials hope to persuade the State Game Commission to deed them the hatchery property, in exchange for the city's promise to construct a new hatchery at another location. In the meantime, studies are under way to determine whether the lower dam would be economically feasible. Constructed to the 185 ft height, the dam would be capable of 160,000 kw, but this would be reduced by at least a third if the height were reduced to 120 ft. Mossyrock Dam, proposed for construction upstream, would produce another 300,000 kw. Total cost of both dams is estimated at $138 million.

Dean Barline, Tacoma utilities director, also is exploring the possibility of securing federal financial participation in the project because of its flood control features. If the federal government participates, there would be no difficulty in acquiring the hatchery, city officials feel.

The Washington State Sportsmen's Council has announced it will seek a referendum to stop the city from damming the Cowlitz River. The proposed referendum would ask for a vote of the people next year on the question of permitting any agency to impede navigation in a watercourse by constructing a dam. It would require 45,000 signatures by June 20, but observers concede the sportsmen would have no trouble in collecting them.

N. D. Air Base to Get 12,350 Ft Concrete Runway

A $11.7 million contract has been awarded by the Omaha District Office of Army Engineers to Western Contracting Co. of Sioux City for work at the Grand Forks, N. D., Air Force Base.

The work is principally airfield paving with concrete pavement ranging from 16 to 24 in. thick. The existing runway will be widened from 100 ft to 300 ft, and will be extended from 10,000 ft to 12,350 ft in length.

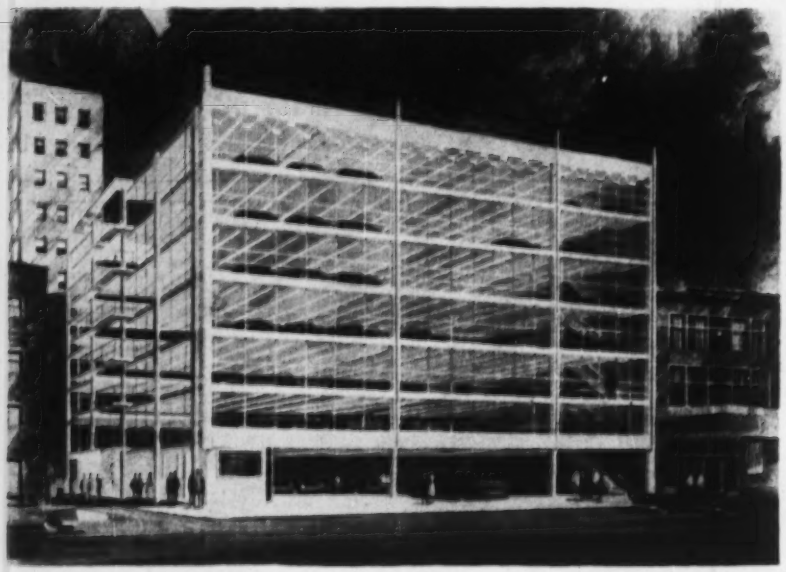
The runway will be the second of such length authorized by the Air Force to be built in portland cement concrete to exacting specifications that require surface tolerances of ⅛ in. in 12 lin ft. longitudinally; and ¾ in. for every 12 ft transversely, where cross slopes are 1% or less—¼ in. where slopes are more than 1%.

First such job is at Dow Air Force base at Bangor, Maine. Overrun areas also will be paved, giving the paved stretch a total length of 14,500 ft. In addition, taxiways are to be extended and widened, and aprons provided for parking purposes.

Work is occasioned by the fact that the still uncompleted base has been changed from an interceptor base to a combination interceptor and heavy bomber base. The original runway, in anticipation of developments, was laid with an off-center crown to tie in with the widening.

Because of North Dakota's severe climate, the runway will be underlain with 6 ft of frost-free material. The runway also follows local highway practice in that it is elevated slightly above the surrounding prairies so that snow will be blown off by the high winds during the winter.

Quantities include 378,000 cu yd of concrete, 29,500 tons of asphaltic concrete surface course and 1.2 million cu yd of excavation.



Design of Garage Will Satisfy Strict Code

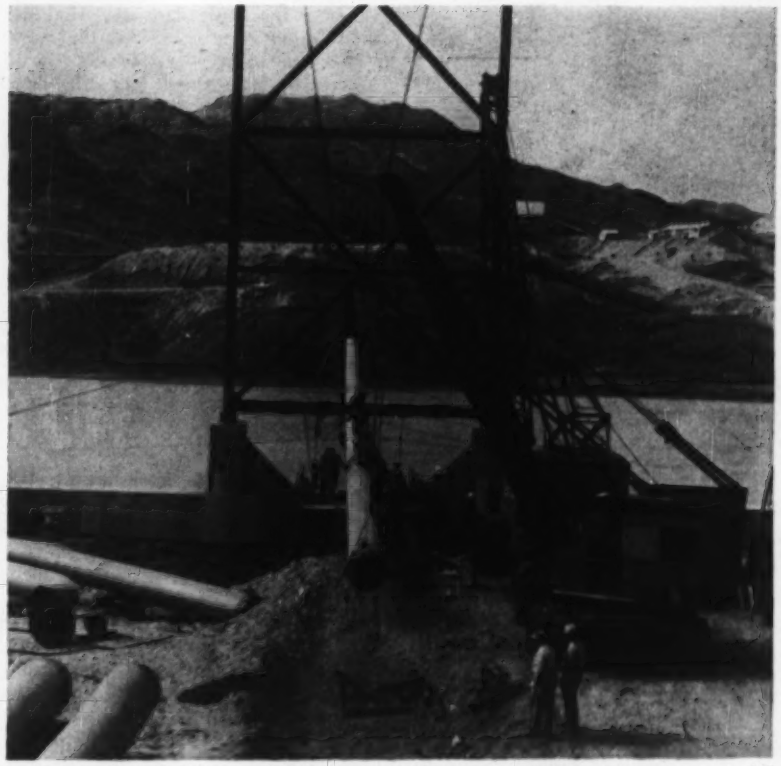
After two years of struggle to meet New York's stringent building code and to obtain a re-zoning variance, erection of an 8 story automatic parking garage, the first such structure in that city, is now being started.

The garage, to be built on an 80 x 100 ft site in midtown Manhattan, will have space for 255 cars. In accordance with city regulations, the building will have an open façade on both it's 45th St. and 8th Ave. sides. Made entirely of reinforced concrete, it will be protected with steel safety cables, placed vertically around the exterior.

The garage will be equipped with an automatic parking system manufactured by Bowser Parking System, Inc. In this system, cars will be moved horizontally and vertically on two elevators hung from moving cranes operating atop a central well. At the proper floor, a car will be driven into its space without the need for moving previously stored autos.

The $1 million garage structure is expected to be opened for use in the late fall.

Gage & Martinson, New York, are the engineers in charge of the project. Balaban Gordon Co., Inc., is the general contractor.



TWO LARGE CRANES push gas line across 1,080 ft span. Weight of the pipe suspended from the H-frame is 90 tons and the gas in the pipeline will weigh another six tons.

Gas Line Swings Over the Colorado

Two new pipeline bridges across the Colorado River at Topock, Ariz., will make the small community the site of the largest natural gas metering station in the world, with a daily average of 1.5 billion cu ft enroute for consumption in California.

Gas is piped 450 miles across New Mexico and Arizona to Topock from the San Juan Basin near Farmington, N. M.

The new bridges, jointly owned by Pacific Gas & Electric Co. and El Paso Natural Gas Co., will make a cluster of five at Topock—three pipeline units carrying natural gas, one railroad and one highway span.

One crossing under construction—shown above—is a $350,000 H-frame suspension bridge, 1,080 ft long and designed to support a 34 in. pipeline.

Another crossing being built nearby is an A-frame suspension bridge that will be 900 ft long and also provide for a 34 in. line.

On the H-frame bridge, the pipe weight is 90 tons. The 27 joints of 40 ft pipe used in the span were pushed out at the rate of four welded joints at a time.

Two 100 ft steel towers on opposite banks of the Colorado support two pairs of 2¾ in. galvanized steel ropes. From each pair will drop 35¼ in. suspender cables to hold saddles in which the steel pipe will rest.

The bridge is designed to support up to 350 tons. (Added to the 90 ton pipe weight is a gas load weight of 12,000 lb.) It's also designed to stand wind-velocities of 100 mph, far in excess of these recorded in the area. But, on occasion, the wind is capable of exerting a 100 ton pull on the bridge, which accounts for the high stress specifications.

To give the bridge stability and to prevent the pipeline from swaying, 75 ft reinforced concrete spars will extend from the lower side of each tower. The spars will hold "sway cables," which will be tied to concrete anchor blocks at each bank of the river.

With expansion loops on each end of the bridge, the pipe crossing can expand 8 in. under desert heat conditions that cause a pipeline temperature of more than 160 deg.

(Since the El Paso company does not operate in California, it officially delivers gas to PG&E at the middle of the river—the state line.)

The bridge was designed by Harold B. Hammill, San Francisco consulting engineer, and is being built by Fisher Contracting Co. of Phoenix.

Waste Works Started

Cyanamid starts $4.5 million activated sludge plant that will serve towns, too

Right on schedule, American Cyanamid Co. broke ground last week in Bound Brook, N. J. for $4.5 million activated sludge industrial waste treatment plant which will also give secondary treatment to domestic sewage from three neighboring municipalities.

Banded together as the Somerset-Raritan Valley Sewerage Authority, the three communities of Somerville, Raritan and Bridgewater expect to begin construction of $2.8 million of interceptors and a primary treatment plant adjacent to the Cyanamid plant this June. Both plants are expected to be in operation early in 1958, or shortly after the lower Raritan River works now under construction by the Middlesex County Sewerage Authority are scheduled to go into operation.

Much interest has been centered on the upper Raritan pollution control scheme, concerning its unique aspect of a private industry accepting domestic sewage and technical problems of giving effective biological treatment to largely inorganic industrial wastes (ENR Mar. 22, 1956, p. 25). After expending more than $750,000 on experimental and pilot plants for both filtration and activated sludge treatment, American Cyanamid finally adopted the latter because of higher efficiencies obtained.

As designed by Whitman, Requardt & Associates, Baltimore, the Cyanamid plant will have six aeration tanks and six final settling tanks, capable of handling 20 mgd containing about 40,000 lb per day of biochemical oxygen demand.

The Baltimore consultants are also designing the authority's primary plant. John W. Ryan Construction Co., New York City, is contracting much of the industrial facility.

Welding Failures to Be Discussed at Conference

A conference on welding engineering to be held at the Army Corps of Engineers Research and Development Laboratories, Fort Belvoir, Va., will discuss case histories of failures in welding and their causes and cures.

Industry and government agencies are invited to submit such histories so they may be included in the discussions. Attendance is by invitation only. Papers presented at the conference, to be held April 29 through May 1, 1957, are expected to be published as a reference volume.

New 1,200-ft-long, 38.2-ft-lift lock on Upper Mississippi is . . .

The End of a Plug in the River

A serious bottleneck to traffic on the Upper Mississippi Waterway will be eliminated in a week or so when a new lock at Keokuk Dam in Iowa, goes into operation.

Lock 19 is a big one.

At low water it will have a lift of 38.2 ft—usual lift at other locks on the upper river is about 10 ft. It is 1,200 ft long—about twice the length of the others.

And only 9 minutes are needed to fill or empty the 110 ft wide lock—the same time as is required at any of the shorter and lower ones.

Other big-scale proportions of Lock 19 are: length of lower land wall—605 ft, length of lower river wall—532 ft, length of upper land wall—237 ft.

The upper guard gate is a submergible, vertical lift, single leaf gate, 116 ft wide and 21 ft high; weight of moving parts is 210,000 lb. Upper service gate is same type as the guard gate and 117 ft wide by 27 ft high; weight of moving parts 225,000 lb. The lower service gate is a miter gate of two leaves, each 61 ft wide, 52 ft high and each weighing 376,000 lb. Design of the 14.5 x 17 ft culverts for emptying and filling the lock followed hydraulic model studies.

The $13 million lock will replace one built in 1910 that is still in use. Only 358 ft long and 110 ft wide, the old lock usually required three or four lockages to pass most tows.

The new facility can handle these in one locking. Also, it had reached the end of its economic life—even with almost yearly repair.

The lock that No. 19 replaces became part of the Upper Mississippi River canalization project started in the early 1930s and completed in 1940. The project provides a navigation channel 400 ft wide and 9 ft deep between Alton, Ill., and Minneapolis, Minn. A series of 26 locks and dams built over this reach of the river complete the project.

As traffic increased each year, delay time encountered by tows at Keokuk also increased. The new lock came not a year too soon, for it was figured that the 1956 tonnage, 6.3 million tons, was maximum capacity for the small lock, which was built in the days of the packet boat.

The work at Keokuk has been directed by Col. John L. Wilson, Jr., District Engineer of the Rock Island District, Corps of Engineers. Resident engineer for the Corps is Norman E. Allen. Main contract for the four contract job was let to J. A. Jones Construction Co. of Charlotte, N. C.

Road Award Is Approved Ahead of Fund Allocation

Arizona's Supreme Court has cleared Highway Department action in placing a contract extending over several years, but for which specific funds have not been allotted in the present fiscal year.

The court decided the Highway Department was within legal rights in contracting for $2 million with Peter Kiewit Sons' Co., of Phoenix and Denver, for construction of 1,400 ft Mule Pass Tunnel on U. S. 80 near Bisbee.

The suit had been brought to test legality of the contract, specifically on the ground the contract amount exceeded the sum budgeted for it this year.

Opponents claimed the practice was deficit financing and that state law specifically forbid it.

This year 11 other major highway jobs have been placed under contract under circumstances identical with those of the Mule Pass job. Had the court ruling been otherwise, the Highway Department would have been required to halt them and the state auditor instructed not to honor warrants against the jobs.

Hurricane Aftermath

Bridges in Pennsylvania to be repaired by summer

Reconstruction of the majority of the 106 northeastern Pennsylvania bridges that were totally destroyed or severely damaged by Hurricane Diane nearly two years ago will be completed this summer, Secretary of Highways Joseph J. Lawler said last week.

Where bridges were totally destroyed, the department had quickly restored communications by installing temporary bridges and by using secondary roads.

Incidentally, Lawler said, in many cases the temporary bridges were better able to handle heavy traffic than the antiquated structures they replaced. As new bridges have been constructed, these temporary structures have been removed and detours eliminated.

Work on several structures now under construction was started last summer. Delays in procuring steel and extreme cold weather in the Pocono region have been among the factors retarding completion.

In the Allentown district, where 45 bridges were destroyed, the department has completely reconstructed 15 structures.

Another 16 bridges are under construction in Monroe County, with assurances from contractors of completion in May.

Design work is under way on the balance of the Monroe bridges with final drawings expected soon.

Cost of the reconstruction job on the 30 bridges already completed or under construction is estimated to be in the neighborhood of $4 million. Work on the remaining bridges is estimated to be $2 million, although final construction plans may alter this figure.

In the Scranton district, 61 bridges were destroyed by the hurricane. Work is under way on the reconstruction of 29 of these bridges, with completion dates sets for 18 more by June. The rest are scheduled for completion later in the summer.

There are now 29 bridges under contract, while six bridges have been completely restored. Plans have been completed for nine other bridges and are awaiting final approval. And department engineers and consultants are completing plans on 17 other projects, which will be submitted for approval within a short time.

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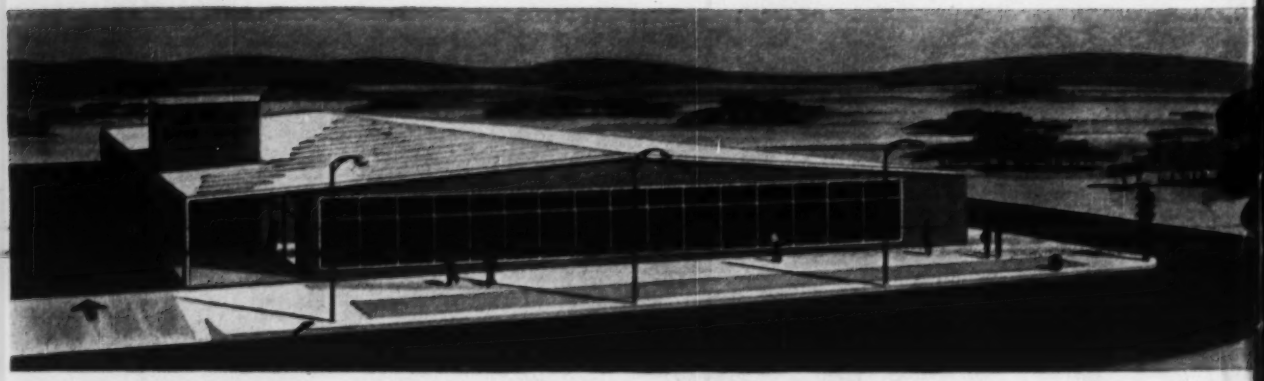


LOW . . . WIDE . . .

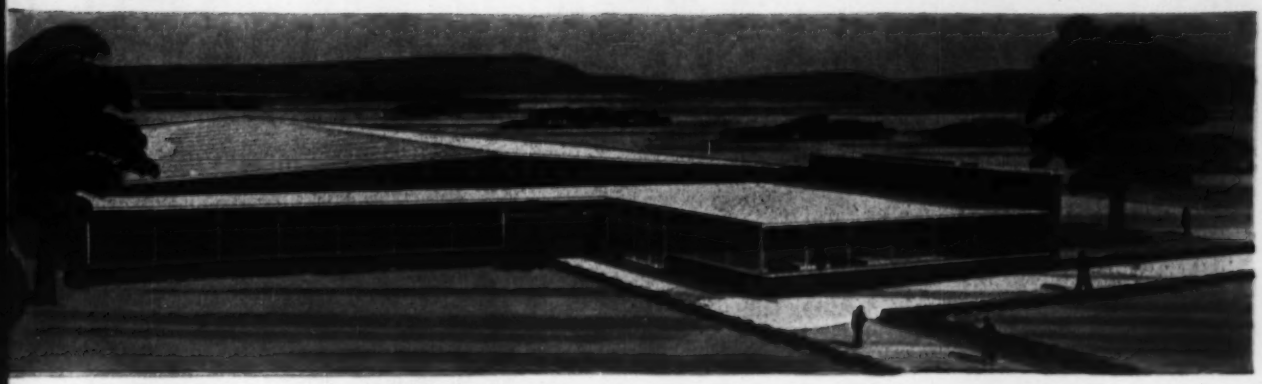
New Butler Low-Profile Building System clear-span interiors to super markets,

Now, you can get modern, flat-roof appearance in a commercial or industrial building with the efficiency only a clear-span interior can offer. Yet you pay no more for this unique combination of advantages than for ordinary construction with its forest of interior posts and trusses.

An exciting "first" in modern construction methods makes it possible. It's a new, low-profile building system developed by Butler, world's largest manufacturer of pre-engineered buildings. This building system uses a specially designed steel framework so strong it can bridge floor areas up to 100 feet wide without using a single post or roof truss. The interior is wide open—wall to wall. There's nothing to limit layout planning, partitioning, illumination or decoration. Outside, the roof line of this framework is so low that the building it produces looks almost flat roofed—as modern as today's newest architecture.

With traditional construction methods, this combination of a low roof profile and a clear-span interior is virtually unattainable at any reasonable price. Yet, because of the construction economies inherent in the Butler Building System, you get both at no extra cost.

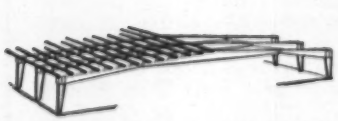
For details of this new low-profile building system, contact your nearby Butler Builder. He's listed in the Yellow Pages of your phone book under "Buildings" or "Steel Buildings." Or write us.



AND HANDSOME

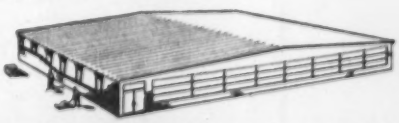
brings modern, sweeping look and showrooms, factories and warehouses

Here's why the Butler Building System is the lowest cost way to build well



Steel framework is pre-engineered to fit together perfectly and speed construction. Frames are mass-produced for lower cost. Selection of widths and lengths.

Fire-safe metal roof panels are bolted on as soon as framework is up, putting building under roof in days. Interior finishing can start earlier and proceed faster under cover.



With "core" of building in place, walls, partitions, windows, architectural treatment and insulation cost less since non-load bearing construction can be used.

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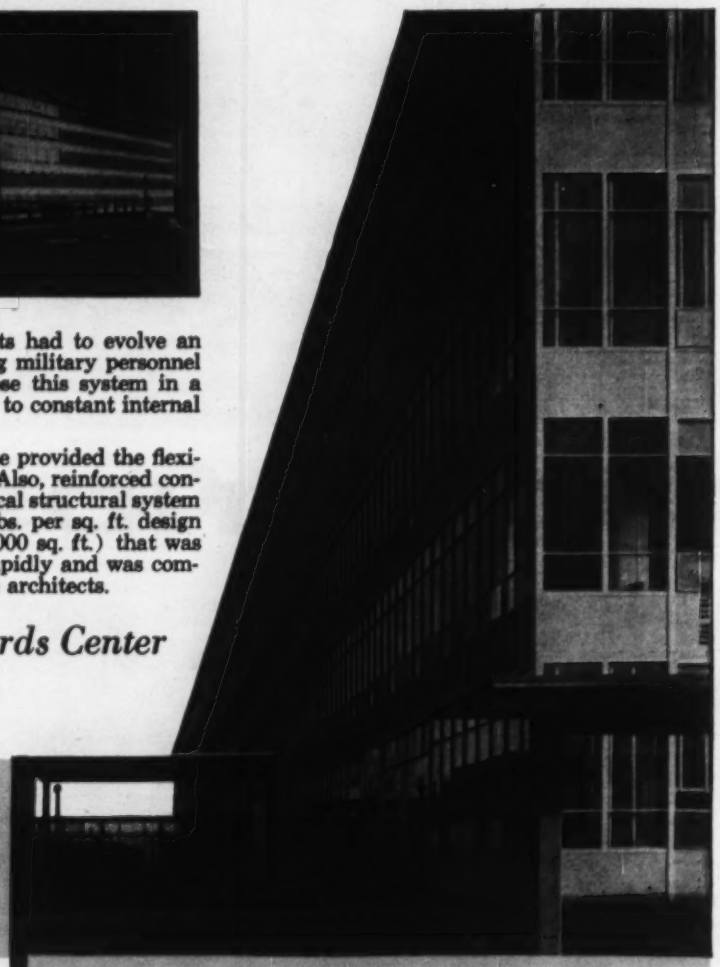
THE PROBLEM: First, the architects had to evolve an efficient, functional system for handling military personnel records; second, they wanted to enclose this system in a single building which would be subject to constant internal rearrangement.

THE SOLUTION: Reinforced concrete provided the flexibility of design for these requirements. Also, reinforced concrete was specified "as the only economical structural system to support the heavy live loads (200 lbs. per sq. ft. design load)." The six story building (1,340,000 sq. ft.) that was eventually constructed went up very rapidly and was completed in record time, according to the architects.

New U. S. Military Records Center features functional



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For the new U. S. Military Personnel Records Center, the architects chose a reinforced concrete frame and flat slab floors with underfloor electrical distribution ducts. This system provides a complete network of underfloor electrical outlets for power, light, telephone, and intercom systems—at a new low cost. Outlets can be connected to convenient risers in a matter of minutes without ripping up or drilling through floors and ducts.

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City Planners Should Be Heard Too

Roads "too important" to be planned by engineers alone; highways' effect on cities should be considered

"Highways are too important to leave to the highway engineers"—this was the keynote of a worried and controversial meeting of the National Planning Conference held Mar. 17 through 21 in San Francisco by the American Society of Planning Officials.

The opinion as voiced by John T. Howard, associate professor of city planning at MIT, who said that the new program forces highway engineers "to make decisions that have impacts far outside their field".

In decrying failure of the federal highway act to bring city planners into the highway development picture, Mr. Howard said that expressways may well turn out to be one of the strongest controls over land development and use.

According to Mr. Howard, highways to be built during the next 20 years "will have more effect upon all form and patterns of growth, and therefore upon the character and structure of our metropolitan areas, than all of the metropolitan planning done by city planners between 1945 and now." He emphasized that a highway that produces a pattern of land development and population distribution that worsens livability and efficiency of a metropolitan area rather than bettering it is a disservice to the community even if it carries traffic to capacity."

Carrying traffic is the function of a highway, not the purpose, Mr. Howard maintains. The purpose of a highway, he said, is to serve the community, and for these reasons it is "lamentable" that the federal highway act does not require that highway engineers either take note of metropolitan planning or permit review of their preliminary plans.

To explain this concern, Mr. Howard said that public hearings may well be held too late to change unsatisfactory highway planning.

By way of supplementing Mr. Howard's ideas, Grady Clay, real estate editor of the Louisville Courier Journal said: "I would feel much safer if I knew every mile of express highway were being fitted into community plans from the beginning and not laid out to follow lines of least resistance, cheapest land or a politician's rush for glory. . . . I would feel much better if the recommendations of the American Society of Landscape Architects were written into the federal highway act." Mr. Clay also suggested that highway rights-of-way be widened to as much as 3,000 ft to provide space for mass transit facilities, recreational areas, pipelines and other utilities.

• **Airport planning**—In another phase of the conference—a discussion on airport and heliport planning—Thomas M. Sullivan, chief of the Port of New York Authority's Aviation Planning Division, argued in favor of ground heliports rather than roof-top facilities because roof-top sites were too small and created both safety and fuel supply problems.

Waterfront sites, according to Mr. Sullivan, are ideal because they provide clear over-water approaches, easy fuel delivery by barge and expansion in a neighborhood that is usually commercial rather than residential.

To accommodate standard commercial airliners, Mr. Sullivan predicted that more cities will be adding a second commercial airport to their facilities. The two airports, he said, should be at least 16 miles apart and their instrument runways should be parallel alignments so that they can be operated independently.

Mr. Sullivan also pointed out that the capacity for a single airport can be doubled by the construction of a second instrument runway parallel to the first. This would permit takeoffs on one runway and landings on the other.

Economic Suicide

Chicago reveals effect of wasted cooling water for air conditioning units

How expensive non-conserved cooling water for air conditioning can be—for the supply agency—has been pinned down by the city of Chicago. The figures were presented at a recent meeting of the Illinois Section, American Water Works Association, by H. H. Gerstein, Assistant Chief Water Engineer of Chicago's Bureau of Water.

Because of low water rates and the short air conditioning season in Chicago, revenue from sale of cooling water does not begin to cover even the annual fixed charges for water system capacity required during peak demands. Mr. Gerstein computes an annual fixed charge per ton of air conditioning at $43.20 versus revenue of only $14.40 per year from non-conserved water per ton of air conditioning. The $43.20 is based on use of 1½ gpm per ton of air conditioning, a cost of $400,000 per mgd of plant capacity, including filtration, pumping and distribution, and 5% for depreciation and interest. The revenue is based on 1,000 hours per

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year operation of air conditioning equipment and a water rate of 16 cents per 1,000 gal.

Chicago actually is not yet in the fix just described, for until now its supply system has had capacity to meet peak demands, including air conditioning cooling water. And it hopes to avoid the problem by forcing use of cooling towers through some sort of regulation —either a demand charge for wasted cooling water, installation of air cooled units, a flat requirement of cooling towers or combinations thereof.

At present, there are about 300,000 tons of water-cooled air conditioning units in Chicago, of which only 10 to 15% are equipped with cooling towers. In 1954, during hours of maximum system demand, when pumpage reached a 1,750 mgd rate, air conditioning cooling water requirements reached a 250 mgd rate, or 0.78 gpm per ton based on 222,000 tons installed in that year. The 0.78 is accounted for by cooling towers and non-operation of some air conditioners. On this actual use basis, annual fixed charges for plant capacity amount to $22.50 per ton of air conditioning.

Even without any regulation curbing wastage of cooling water, Chicago would not be facing its problem were it not for its low water rates. Mr. Gerstein and others in the city have determined that economic advantage begins to obtain for cooling tower installation at a water rate just in excess of 16 cents per 1,000 gal, coincidentally Chicago's new rate beginning May 1.

Chicago's detailing of the economic suicide of its present policy on non-conserved cooling water should be a strong weapon in the hands of its water engineers and city administrators—and to their counterparts in other cities with similar policies—to push through appropriate alleviating measures.

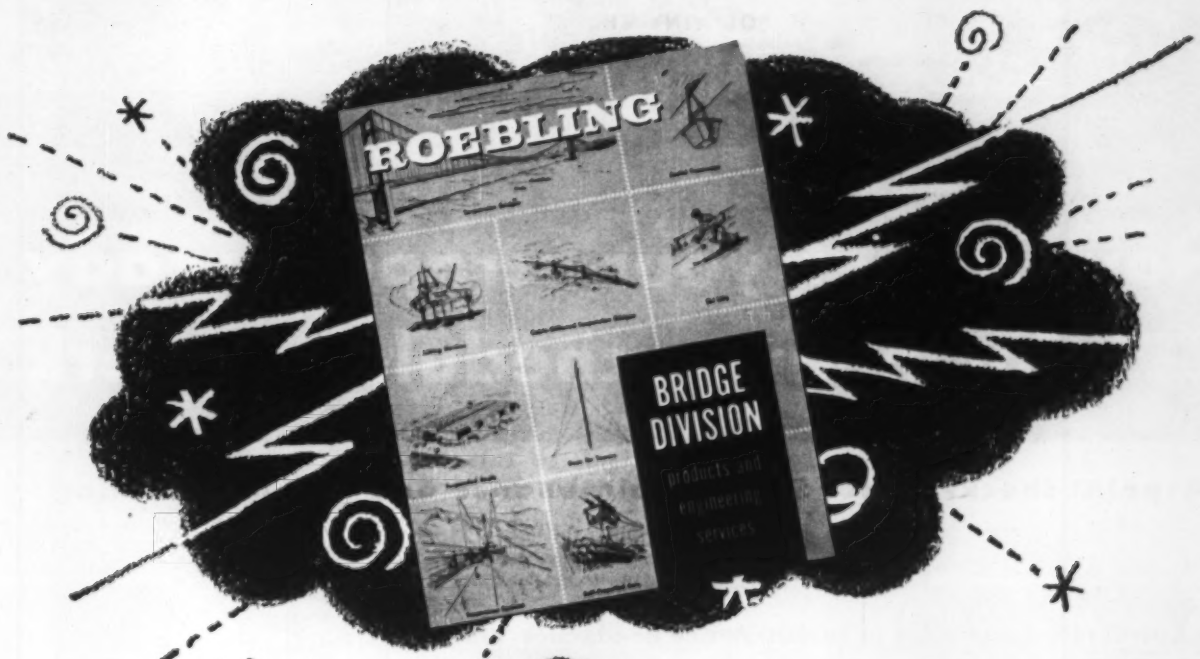
Bridge Designers to Vie For $50,000 in Prizes

Cash prizes totaling $50,000 will be awarded in a bridge-design contest just announced by the James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

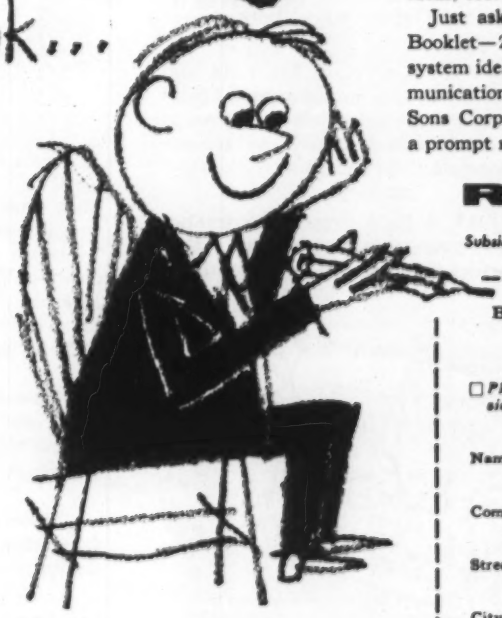
Sixteen awards, starting with a first prize of $10,000, will be made for the best designs submitted for welded highway bridges that are or could become a part of the National System of Interstate and Defense Highways.

Any type of design that follows that network's general requirements may be submitted. Entries will be judged on economy, appearance, quality of detail.

The new competition, fourth in a series sponsored by the Lincoln Foundation, is open to all residents of the U. S. or its possessions.



New Roebling Brainstorm Book...



You might even call it a "suspension adapter" for, more than anything else, it is designed to foster imaginative flights into the realm of the remarkably possible things that can be, and are being done with suspension systems.

Its greatest single purpose is to show you what is now happening in this field and, that these present exciting examples were, not very long ago, just ideas. Good ideas, too.

Just ask for the newest Roebling Bridge Division Booklet—24 pages—with the newest in suspension system ideas. It's number is D-933. Any means of communication to Bridge Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, will bring a prompt reply.

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44-point check-list for Spring maintenance and "de-mothballing"

You'll eliminate a lot of maintenance headaches, and get steadier dirtmoving output during the busy season ahead, by carefully preparing your equipment. Remember, a $5 repair put-off today, may cost you $500 in lost dirtmoving time later! This check-list will help your crew head-off most equipment-failure troubles before they start.

General

☐ **1.** Before moving machine, check: closure of all drain-cocks; adequate level of coolant, lube oil, hydraulic fluid; tire pressure.

☐ **2.** Adjust parking brake for positive holding.

☐ **3.** Clean and inspect structure and frame-members of scraper and prime-mover; weld or replace broken parts; paint exposed metal.

☐ **4.** Check axle bearings; adjust or replace; lubricate.

☐ **5.** Clean and check ball-and-socket joints, hinge pins, tailgate rollers and bearings; adjust or replace as required.

☐ **6.** Inspect cable sheave wheels and rollers; replace if worn or if not functioning 100% smooth.

☐ **7.** Replace weak or frayed control cables; lubricate (except for heavy-dust operations).

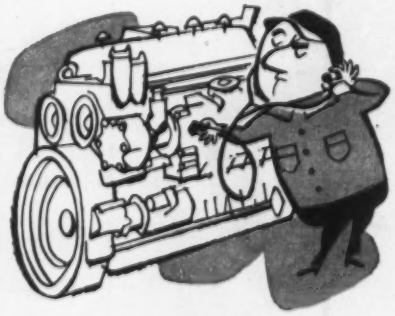
☐ **8.** Replace, reverse, or surface-weld worn cutting blades; replace worn ground plates.

Tires and Rims

☐ **9.** Check rims for bent or damaged flanges; repair or replace, as needed. Tighten wheel bolts.

☐ **10.** Check tires for cuts and breaks; remove stones or metal fragments; recap or switch worn tires to trailing wheels; repair or replace damaged tires and tubes.

☐ **11.** Inflate tires in accordance with your operating manual. Post correct tire-pressure schedule in cab.



Engine

☐ **12.** Perform all periodic maintenance procedures (incl. 1000-hr check), as shown in engine manual.

Cooling System

☐ **13.** Drain and back-flush radiator, engine block, oil cooler and compresser jackets. Remove scale with sal soda or good radiator cleaner; flush thoroughly. Repair leaks in radiator, water pump, gaskets, hoses and connections. Refill radiator as follows:

Freeze-up zone — use permanent anti-freeze (ethylene glycol) to give year-round protection, adding clean, clear water to fill system.

Warm zone — use clean water, free from lime or alkali; add rust inhibitor or 4% soluble oil.

☐ **14.** Check thermostats for opening temp., and full closure; discard 'stats not operating as stamped.

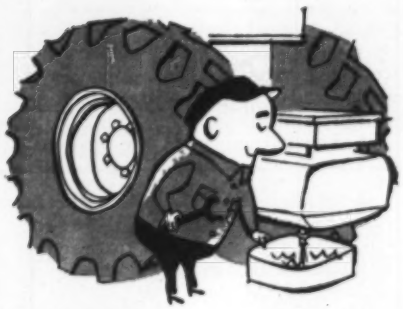
☐ **15.** Clean dirt and bugs from radiator core and fins.

Cooling System (continued)

☐ **16.** Check water-pump pulleys for slippage or excessive "play"; repair or replace as required.

☐ **17.** Replace frayed or stretched fan and water pump belts; set tension to ¾" deflection under thumb pressure.

☐ **18.** Check accuracy of dashboard temperature gauge.



Fuel System

☐ **19.** Drain water and dirt from fuel tank and filters.

☐ **20.** Change filter cartridges; clean strainer.

☐ **21.** Adjust fuel pump to supply recommended pressure.

Electrical System

☐ **22.** Clean and inspect for loose or broken wires and cables; check solenoid and contactor action; dress or replace burned contactor points; tighten leads.

☐ **23.** Clean and inspect starting motor and Bendix drive; replace brushes if worn; tighten leads.

☐ **24.** Clean and inspect generator; replace brushes if worn, tighten leads. Check ammeter; adjust generator to recommended charge rate.

☐ **25.** Scrape corrosion off battery, box, and cables; wash with bicarbonate of soda solution (1 lb. per gal.); rinse with water. Apply thin coat vaseline to terminals. Check plug vent holes.

☐ **26.** Check battery for dead cells; add distilled water if plates are exposed; recharge.

☐ **27.** Check lights and illuminated warning signals; replace burned-out lamps.

☐ **28.** Clean and inspect electric motor windings, rotor and brake, adjust brake clearance; tighten leads.

☐ **29.** Check all electric switches for. positive, instant action; clean, repair, or replace as required.

☐ **30.** Clean transformer; check and tighten leads.

☐ **31.** Blow dust from rectifier; clean pre-cleaner cap.

Air System

☐ **32.** Inspect for damaged air lines and fittings; repair leaks; replace bent or dented tubing.

☐ **33.** Check diaphragm of multiple-disc brakes. Clean hub splines.

☐ **34.** Bleed water condensate from air supply tank (add alcohol in freezing weather).

☐ **35.** Clean compressor air cleaner; refill with oil. Replace frayed or stretched compressor belts; set tension to ½" deflection under thumb pressure.

Hydraulic System

☐ **36.** Inspect for damaged hydraulic lines and fittings; repair leaks; replace bent or dented tubing.

☐ **37.** Check for cylinder leakage, bent rods, seals; repair.

☐ **38.** Check pumps for leakage; adjust belt tension. Set pressure per manufacturer's recommendation.

☐ **39.** Check operation of all relief valves.

☐ **40.** Bleed air from lines; check fluid level.

Lubrication

☐ **41.** Clean and inspect all lubrication points, replace broken lube fittings; clean screens and strainers; install new filter cartridges.

☐ **42.** Thoroughly lubricate engine, transmission, prime-mover, and scraper according to *all* periodic lubrication *schedules* suggested by manufacturer (including 1000-hr. or 100th-shift check). Use lubricants specified by manufacturer.

Finally, before operating

☐ **43.** Be sure all drain-cocks are closed; check for full level of coolant, lube oil, and hydraulic fluid.

☐ **44.** Check parts stock and build up inventory for quick repair and less down-time.

Write or phone for as many copies of this LeTourneau-Westinghouse check-list as you need.

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How to Design Steel by the Plastic

- **Plastic design makes possible savings in structural steel**
- **It generally is simpler than the conventional theory**
- **It agrees more closely with ultimate strength tests**

Frederick S. Merritt
Senior Editor

The time has come when you can start designing structural steel buildings by the plastic theory. Tests and analytical studies have developed sufficient information to enable you to apply the theory with confidence—at least to statically loaded, continuous frames for one-story structures.

Plastic design, also known as the limit-load or ultimate-load method, takes advantage of the ductility of steel. It utilizes the substantial reserve strength possessed by a steel beam after the yield point has been reached in one portion.

In plastic design, you multiply the design, or working load, by a safety factor to obtain the required capacity of the structure and its components. Then, you design the structure to supply this capacity in bending. (Separate checks must be made for shear, buckling, and perhaps deflection.) Under the working load, stresses will be within the elastic range, though probably higher than the working stresses used with conventional elastic theory.

The plastic theory has been verified by extensive research in the U. S. and abroad. Last spring, it got a big boost when results of a ten-year research program at Lehigh University were released. Since then, the American Institute of Steel Construction, one of the sponsors of plastic-theory research, has been encouraging engineers to adopt plastic design and is hard at work preparing a design manual.

As now recommended, the theory en-

1. IDEALIZED STRESS-STRAIN DIAGRAM in the plastic theory is based on the assumption that stress beyond the elastic limit is constant though strain increases. Also, the upper yield point is ignored. The variations ignored have a negligible effect on ultimate strength of a beam.

The current plastic theory is limited to the range up to the start of strain hardening, and it assumes that both the compression and tension fibers of steel beams behave as indicated in the diagram. In accordance with these asumptions, let's see what happens in a rectangular beam when the extreme fibers are at the three stages noted in the diagram on the right.

2. CROSS SECTIONS remain plane as bending increases; i.e., unit strains, ϵ, are proportional to the distance from the neutral axis.

At stage 1, extreme fibers of the rectangular section are at the yield point. Unit strain varies linearly from zero at the neutral axis to ϵ_y at the outer fibers. Since at this stage unit stress still is proportional to unit strain, stress also varies linearly—from zero at the neutral axis to s_y at the outer fibers. Total resistance to bending at stage 1 is:

$$M_y = s_y S$$

where s_y is the yield point stress and S the section modulus.

At stage 2, the unit strain in the outer fibers is four times that at stage 1. But the stress there remains s_y, in accordance with the idealized stress-strain diagram. The inner fibers, almost to the neutral axis, also have reached the yield point. So the unit stress varies linearly from zero at the neutral axis to s_y at a short distance away, and from there to the outer fibers the stress is constant.

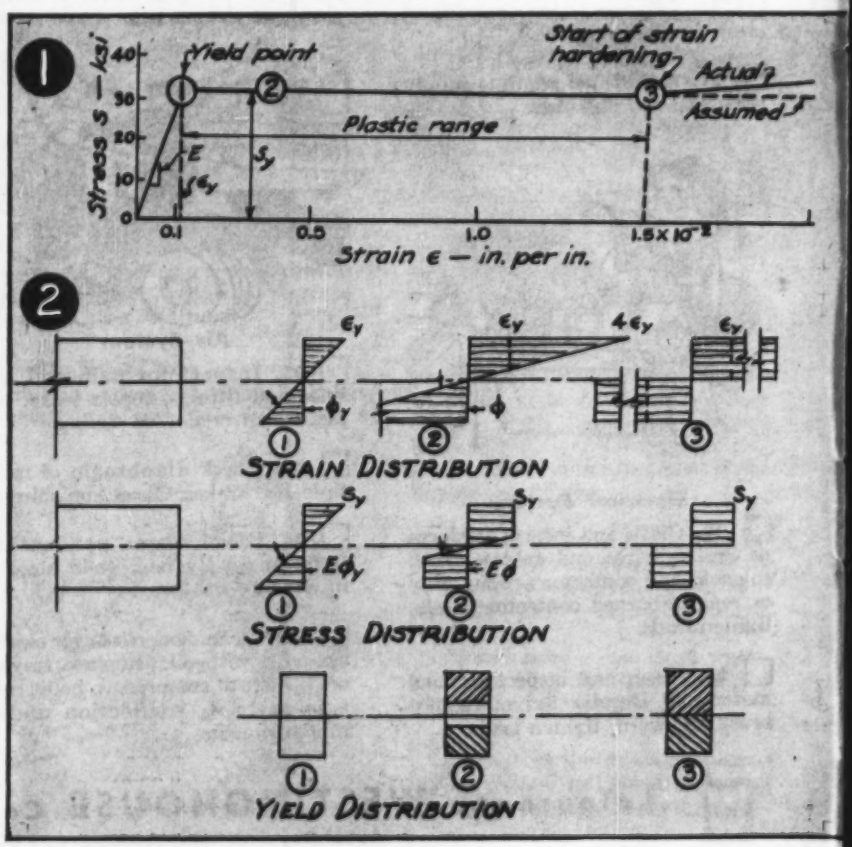
At stage 3, the strains have grown so large that practically the whole cross section has yielded. Total resistance to bending now is:

$$M_p = s_y Z$$

where Z is the plastic modulus and is equal to the sum of the moments of the areas above and below the neutral axis. Thus, for a rectangular section, $Z = 2 \times bd/2 \times d/4 = bd^2/4$, whereas the section modulus, S, is $bd^2/6$.

3. SHAPE FACTOR, f, is the ratio of the plastic modulus to the section modulus. It is also equal to the ratio of the plastic moment to the yield-point moment, M_p/M_y.

Thus, f is a measure of the reserve strength of the cross section after the yield point is reached in the extreme fibers.

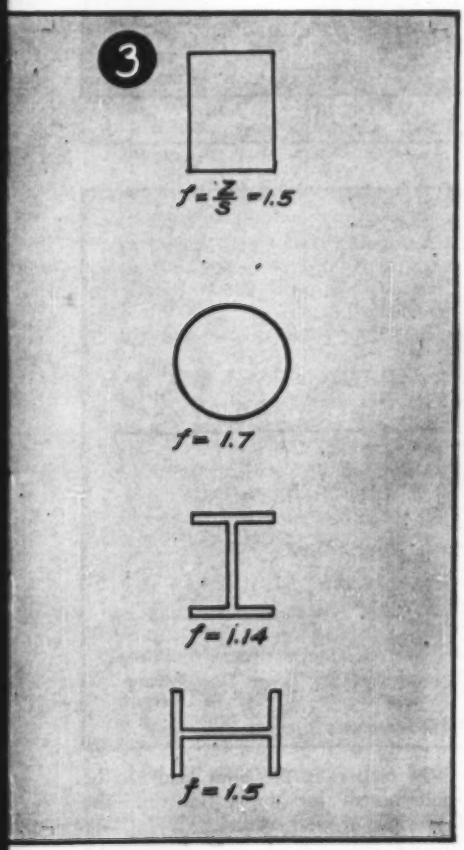


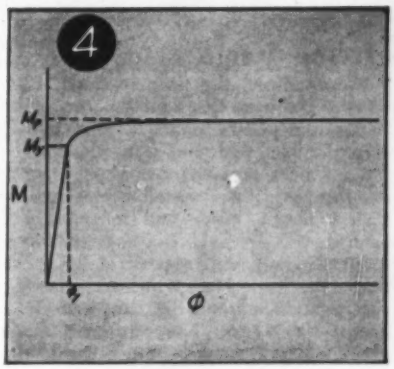
Theory

ables designers to take advantage of the reserve strength possessed at less heavily stressed sections of a continuous beam or frame when the yield point has been exceeded at the most highly stressed sections. The theory takes into account the redistribution of bending moment to less highly stressed sections.

The AISC design manual will offer design rules, formulas and charts to facilitate design of continuous beams and one-story frames. Pending its publication, the following brief description of basic techniques may prove useful. However, the design aids in the manual will make it unnecessary for you to use all these techniques for most commonly encountered structures.

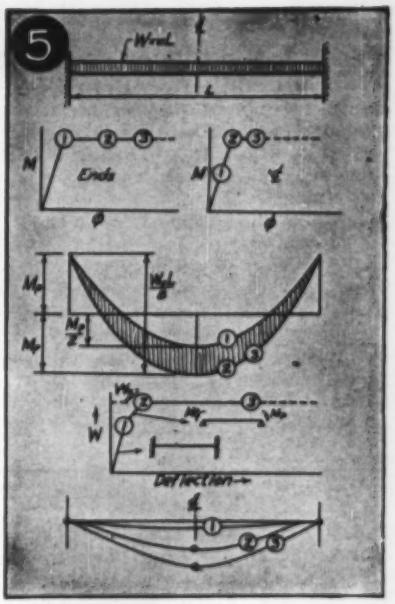
For example, for a rectangular beam $f = \frac{1}{4}\,bd^2/\frac{1}{6}bd^2 = 1.5$. This indicates the beam can carry 50% more moment after it starts to yield . A circular section can carry 70% more, but a wide-flange section generally only about 14% more, with respect to the strong axis, because of the reduction in width between flanges.





4. MOMENT-CURVATURE DIAGRAM indicates that a section carrying peak bending moment continues to rotate with increasing load after the yield point is reached in the outer fibers, while the bending moment resisted by the section remains practically constant. In effect, the section acts as if a hinge came into being at the section after M_p was exceeded.

A plastic hinge is said to have been formed. It is capable of resisting a moment M_p as it rotates freely.

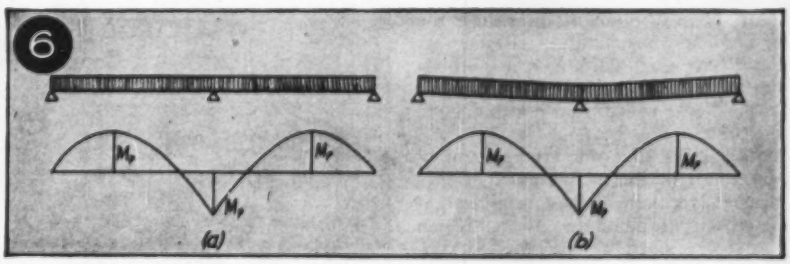


5. FIXED-END BEAM, for example, will develop plastic hinges at its ends when the load is increased to the point where the fixed-end moments equal M_p. Prior to this stage, if the load is uniformly distributed, the midspan moment is equal to one-half the end moments. If the load continues to increase, the beam now deflects as a simple beam, the end moments remaining constant and interior moments increasing.

Finally, when the midspan moment becomes equal to M_p, a plastic hinge forms at midspan, and the beam can carry no additional load. It is said to, under these circumstances, have become a mechanism.

A **mechanism** is a series of pin-connected links that deforms freely without increase in load.

According to the elastic theory, the load causing first yielding was $W_e = 12M_p/L$. At ultimate load, to satisfy equilibrium, $2M_p = W_u L/8$, and the ultimate load is $W_u = 16M_p/L$. Consequently, $W_u/W_e = 1.33M_p/M_p$. If the beam is a wide-flange section, with a shape factor, $M_p/M_y = 1.14$, then the ultimate load is 1.14×1.33, or 1.52 times the load that causes first yielding.



6. SMALL SETTLEMENT of a support of a continuous beam does not limit the loads that can be carried in plastic design, as it does in the elastic theory.

Moment diagrams in (a) and (b) in the sketch above are identical, even though the center support of the beam in (b) has settled. Formation of plastic hinges, as discussed above, redistributes moments; so the ultimate load is the same whether or not a support settles.

Similar reasoning leads to the conclusion that the limit of structural usefulness is not improved by deliberately fabricating a continuous frame so that it must be forced into place during erection. According to the elastic theory, such a procedure—fabricating to close tolerances and force fitting—effects some economy. However, plastic design provides the same savings without resorting to forced fit up.

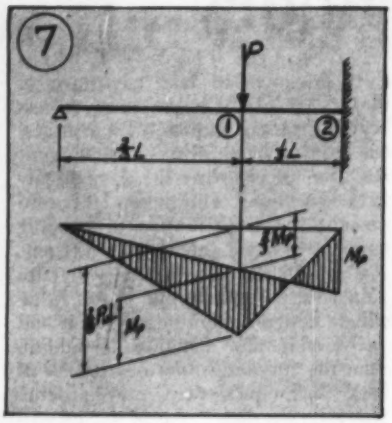
(*Continued on p. 40*)

. . . Plastic theory simplifies frame design

7. EQUILIBRIUM METHOD is one of two approaches recommended for determining the limit load for a continuous structure. It is most useful for structures with relatively few degrees of indeterminancy.

In this method, you first draw a bending moment diagram as if each member of the structure were simply supported. Then, you superimpose a second moment diagram of opposite sign to restore continuity. Next, using the laws of equilibrium, you compute the load that would cause plastic hinges to form at points of maximum moment.

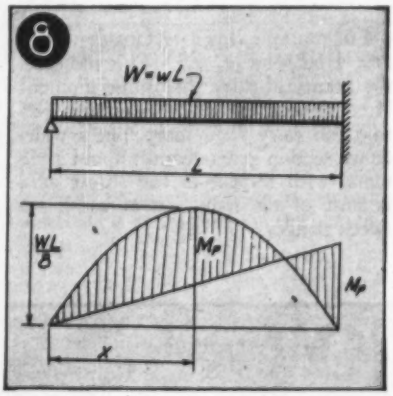
For example, the ultimate load, P_u, for the beam in the sketch is the one that causes plastic hinges to form both at 2, the fixed end, and along the span. Since a peak moment occurs at 1, under the load, it is reasonable to assume that a plastic hinge will form there. So first, you draw the simple-beam moment diagram with a peak of $2P_uL/9$ under the load. Next, you superimpose the negative-moment diagram, with M_p at the fixed end. The combined diagram makes clear that under the load $2M_p/3 + M_p = 2P_uL/9$. Hence, $P_u = 7.5M_p/L$.



8. UNIFORMLY LOADED BEAM will develop an interior plastic hinge at a point that is not as obvious as the one formed by concentrated loads. The location of the hinge can be determined by solving two simultaneous equations —one obtained by taking moments about the hinge, and the other by equating the shear at that hinge to zero, since the moment must be a maximum there.

For example, for the uniformly loaded beam in the sketch, assume that the plastic hinge will form at a distance x from the pinned support. The simple-beam moment at x is $Wx(L - x)/2L$, and it must be equal to $M_p + xM_p/L$. If the shear at the interior plastic hinge is to be zero, then $W/2 - M_p/L - Wx/L = 0$. Simultaneous solution of these two equations yields $x = 0.414\ L$ and $W = 11.65\ M_p/L$.

In many cases, a sufficiently accurate solution can be obtained by substituting two or more equal concentrated loads for the uniform load. Then, the location of interior plastic hinges will be easy to find, because they can form only under the loads. The substitute loading must be chosen to produce the same simple-beam reactions as the uniform load.

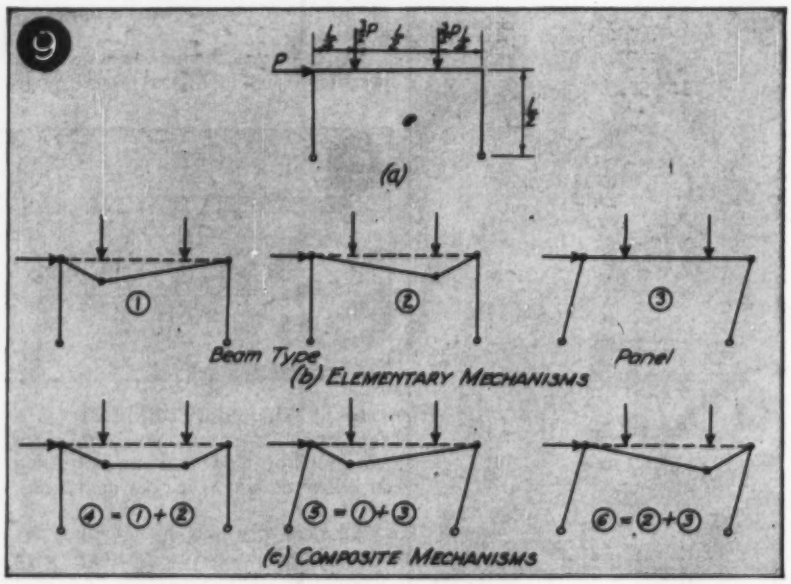


9. MECHANISM METHOD, the other procedure for determining ultimate load, requires you to guess at the probable mode of failure. You assume sufficient number of plastic hinges, at points of peak moment, to reduce the structure to a mechanism. (Remember a mechanism will deform freely without increase in load.) Then, you compute the load that will cause these hinges to form.

Since more than one arrangement of hinges can be found to convert even a simple rigid frame to a mechanism, it is necessary to determine by trial which one is developed by the smallest ultimate load.

For example, let us compute the limit load for the frame (a) in the sketch on the right. (The vertical loading has been substituted for a uniform load equal to three times the horizontal load.) We note first that with the column bases pinned, if the frame is to become a mechanism plastic hinges must form at two or more of these points: atop each column; under each load.

Three elementary mechanisms and three combinations of these elementary mechanisms are possible. The three elementary mechanisms are shown in (b) in the sketch. Three possible combinations of these are shown in (c).



In each case, the limit load can be determined by application of the principle of vital work:

If a system of forces in equilibrium

is subject to a virtual displacement, the work done by the external forces equals the work done by the internal forces.

The only displacements we need to consider are those caused by rotation of the plastic hinges, and these movements are assumed to be very small. Thus, the displacement under a load is equal to the angular change at the center of rotation multiplied by the distance of the load from the hinge.

External work is the product of the loads by corresponding displacements. Internal work at a hinge is equal to the product of the plastic moment and the angular change due to hinge action. The work done by all the hinges must equal the work done by all the loads.

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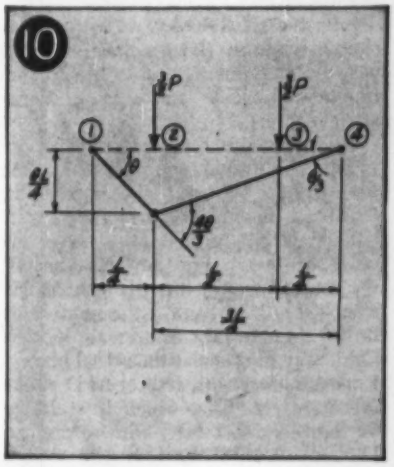
10. BEAM MECHANISM shown on the right is one of the three elementary mechanisms of the frame in (a) in Fig. 9. (Because of symmetry, the two mechanisms in (b) of that sketch have the same limit load; so only one of them need be considered.) The beam in Fig. 10 will be a mechanism when plastic hinges develop at 1, 2 (or 3) and 4.

To apply the virtual work principle, you give the hinge at 1 a small rotation, θ. The displacement at 2 then is $\theta L/4$. Consequently, the rotation at 4, which is equal to this displacement divided by the distance between 2 and 4, must be $\theta/3$. The displacement at 3, therefore, is $\theta/3$ times $L/4$, or $\theta L/12$. And the change in angle at 2 is $\theta + \theta/3 = 4\theta/3$.

The external work equals $1.5P(\theta L/4) + 1.5P(\theta L/12)$. And the internal work is $M_p\theta + M_p(4\theta/3) + M_p(\theta/3)$. When internal and external work are equated θ drops out, and solving the equation, you obtain $P = 5.33M_p/L$.

Consider also the composite mechanism with hinges at 1, 2, 3 and 4. Solution by the principle of virtual work yields the same value of P as for the elementary beam mechanism. (The principle of superposition does not apply in plastic design, because load-deformation relationships are non-linear.)



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11. PANEL MECHANISM is the third possibility for the frame under consideration. We will assume that the same size member is used for the columns and beam; then the plastic moment at all hinges will be the same.

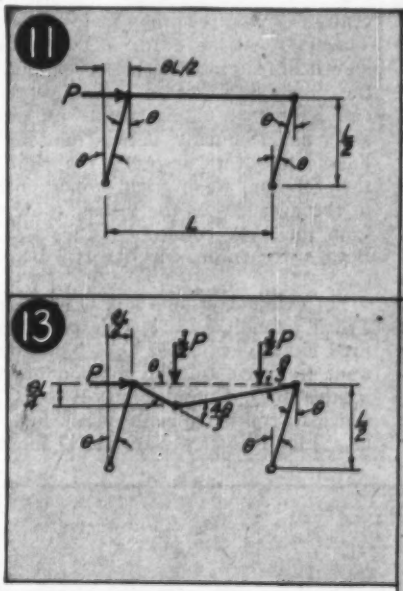
Again the principle of virtual work is used. You give the column hinges a small rotation, θ. Then, $P(\theta L/2) = M_p\theta + M_p\theta$, from which you find the limit load to be $P = 4M_p/L$.

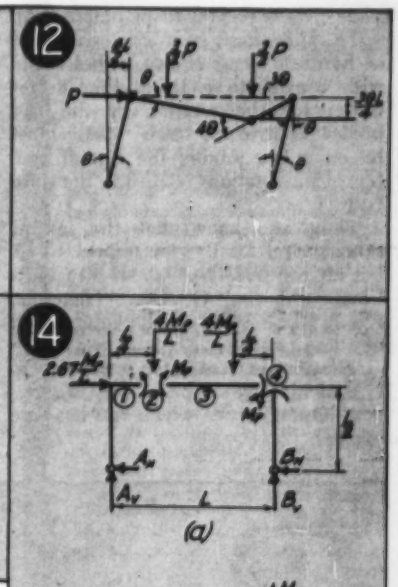
12. COMPOSITE MECHANISM with plastic hinges at 3 and 4 has internal work equal to $M_p[4\theta + (3\theta + \theta)]$. External work totals to $P(\theta L/2) + 1.5P(\theta L/4) + 1.5P(3\theta L/4)$. Equating internal and external work, you find the limit load for this case is $P = 4M_p/L$.

13. THE FAILURE MECHANISM turns out to be the composite shown, with plastic hinges at 2 and 4. Internal work equals $M_p[4\theta/3 + (\theta + \theta/3)]$. And the external work totals to $P(\theta L/2) + 1.5P(\theta L/4) + 1.5P(3\theta L/4)$. This yields the smallest limit load computed thus far: $P = 2.67M_p/L$.

14. EQUILIBRIUM CHECK of the failure mechanism indicates we have indeed found the correct mechanism. Conditions essential to a solution are:

- The structure must be in equilibrium with the applied loads.
- The full plastic-hinge moment must be reached at enough points within the structure to reduce it to a mechanism.
- Moments produced at any point by loads and reactions must not exceed the plastic-hinge moment capable of being developed at that point.





To check the failure mechanism, you first consider the right hand column [see (a) in sketch on the right]: For equilibrium, the horizontal thrust $B_H = 2M_p/L$. Then, considering the structure as a whole, you find $A_H = 0.67M_p/L$; $B_V = 5.33M_p/L$; and $A_V = 2.67M_p/L$. With these values, you can determine all the bending moments and plot the moment diagram. As indicated in (b) nowhere is M_p exceeded.

In general, you don't have to compute the limit load for all possible mechanisms. You try what appears to be the most likely mechanism and then apply the equilibrium check described. If you find that nowhere is the plastic moment exceeded, then you have the correct mechanism.

(*Continued on p. 42*)

...Useful techniques in plastic design of continuous beams and frames

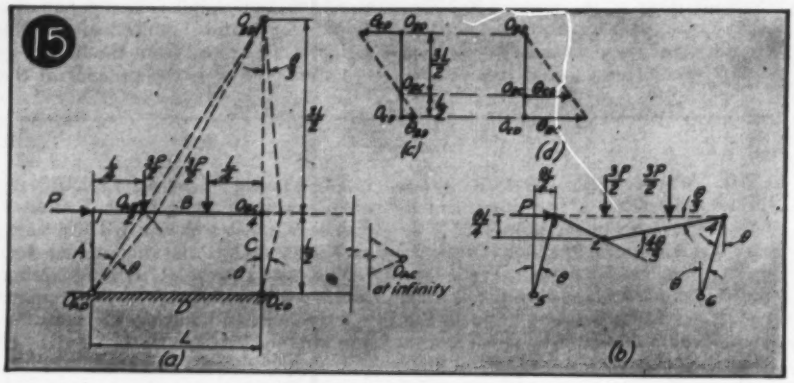
15. INSTANT CENTER—the point about which one body rotates relative to another when it is given a minute displacement—is a useful (but not an essential) tool in applying the mechanism method to gable frames. To illustrate it, however, we will use the simple frame in (b) on the right, and we will determine the displacements and hinge rotations by making use of instant centers.

For convenience, let us assign letters to the links; we will call 5-1-2, A; 2-4, B; 4-6, C; and the fixed link, 5-6, D, as shown in (a) in the sketch. This four-link mechanism has six instant centers. (For any mechanism, the number of instant centers is $n(n-1)/2$, where n is the number of links.) Four instant centers are located right away; they are at the actual hinges. Link A rotates with respect to D about instant center O_{AD}, which is at hinge 5. Similarly, C rotates with respect to D about O_{CD} at hinge 6; B with respect to C about O_{BC} at 4; and B with respect to A about O_{AB} at 2. Two more instant centers remain to be determined.

To find these, you can make use of Kennedy's law: **If two bodies rotate with respect to a third, the instant center for the rotation of the two bodies relative to each other must lie on a line joining the instant centers of the rotations relative to the third body.**

Thus, you know that the instant center, O_{BD}, for B with respect to D, lies on the line O_{CD}-O_{BC}. It also must lie on the line O_{AD}-O_{AB}. Therefore, it must be located at the intersection of these two lines.

The instant center for A relative to C is at infinity, since the lines O_{AB}-O_{BC} and O_{AD}-O_{CD} on which it lies are parallel.



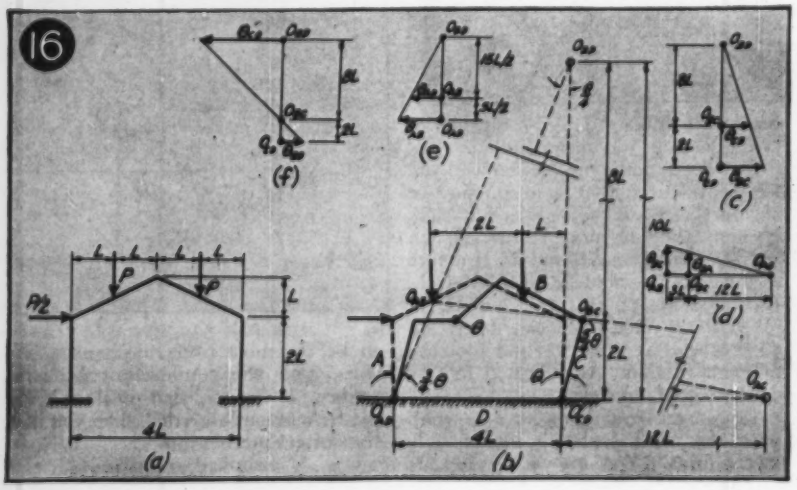
If you know the displacement of any point on one of the links or the rotation of one of the links with respect to one of the others, you can use the instant centers to determine the relative movements of points on the other links.

For one thing, you know that for any link, displacements are directly proportional to the distances from the instance center. You also know that an instant center is a point common to two links. Therefore, starting with a link with known displacement, you can compute the displacement of an instant center and from that, displacements for another link. Similarly, if two connected links rotate with respect to a third, their rotations are inversely proportional to the distances of the instant centers from the hinge connection. (See J. S. Beggs, Mechanism, McGraw-Hill Book Co.).

For example, assume link C is given a small rotation, $\theta_{CD} = \theta$, with respect to fixed link D; i.e., about O_{CD}. Now you want to know θ_{BD}, the rotation of B relative to D. Consider links B and C, which are connected by the plastic hinge O_{BC}. Link B rotates relative to D about instant center O_{BD} when C rotates about O_{CD}. Then θ_{BD} and $\theta_{CD} = \theta$ are inversely proportional to the distances of O_{BD} and O_{CD} from O_{BC}. [See (c) in sketch.] Hence, θ_{BD} can be computed from the relationship: $\theta_{BD} : \theta_{CD} = L/2 : 3L/2$. Thus, $\theta_{BD} = \theta/3$. Or the rotation of B relative to C can be obtained from $\theta_{BC} : \theta = (L/2 + 3L/2) : 3L/2$; and $\theta_{BC} = 4\theta/3$. [See (d) in sketch.]

With θ_{BC} known, you can compute θ_{AB}, the rotation of A relative to B. Involved in this calculation are the instant centers O_{BC}, O_{AB} and O_{AC}. However, the last center is at infinity; thus, $\theta_{AB} = \theta_{BC}$. Finally, using θ_{AB}, you can find θ_{AD} from the relationship: $\theta_{AD} : \theta_{AB} = O_{AD}O_{BD} : O_{AB}O_{BD}$.

Another way of obtaining the same result is to note that 4, as a point on C, is displaced horizontally a distance $L\theta/2$. But 4 also is a point on B. And it rotates about instant center O_{BD}, which is a distance $3L/2$, away. Hence, $\theta_{BD}\ (3L/2) = L\theta/2$, and $\theta_{BD} = \theta/3$. Then, θ_{BC} can be determined from the fact that C rotates through an angle θ and B in the opposite direction, $\theta/3$; therefore, $\theta_{BC} = \theta + \theta/3 = 4\theta/3$.



16. GABLE FRAME shown in (a) can be designed by the mechanism method with the aid of instant centers. Assume that failure will take place when the composite mechanism shown in (b) develops.

Since the mechanism is composed of four links, A, B, C and fixed link D, there are $4 \times 3/2 = 6$ instant centers. Four of these are at the assumed plastic hinges. The other two, O_{BD} and O_{AC}, can be found by use of Kennedy's law. O_{BD} lies at the intersection of lines $O_{CD}O_{BC}$ and $O_{AD}O_{CD}$; similarly, O_{AC} is at the intersection of lines O_{AD} O_{BC} and $O_{AD}O_{CD}$. [See sketch (b)]

In applying the principle of virtual work to this mechanism, you give link C a small rotation, θ, about O_{CD}. Then, considering links B and C, you can compute θ_{BC} from the relationship: $\theta_{BC} : \theta =$

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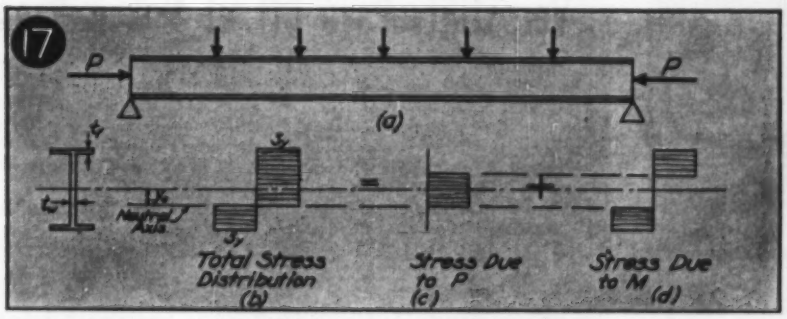
$10L : 8L$. [See (c) in sketch.] This gives $\theta_{BC} = 5\theta/4$. Now, considering links B and A, and using θ_{BC} and instant center O_{AC}, you can find θ_{BA} from: $\theta_{BA} : \theta_{BC} = 12L : 15L$. [See (d) in sketch.] Thus, $\theta_{BA} = \theta$.

Finally, you have to determine θ_{AD}. One way is to consider links A and B and use the value of θ_{BA} just obtained and instant center $O_{BD} : \theta_{AD} : \theta = 15L/2 : 10L$. [See (e) in sketch.] Hence, $\theta_{AD} = 3\theta/4$. (Or with links A and D and $\theta_{CD} = \theta$, with instant center $O_{AC} : \theta_{AD} : \theta = 12L : 16L$.)

The internal work, assuming the same steel section is used for all members of the gable frame, is then $M_p\theta(1 + 5/4 + 1 + \frac{3}{4}) = 4M_p\theta$.

The displacement for the horizontal load is $2L \times 3\theta/4 = 1.5L\theta$. To find the displacements of the vertical loads, you need to know θ_{BD}, the angular change of B relative to D. It can be obtained from a consideration of links B and C and instant center O_{BD}, using the known value, θ_{CD}; i.e., $\theta_{BD} : \theta = 2L : 8L$ [see (f) in sketch], from which $\theta_{BD} = \theta/4$. The displacements at the loads then are the product of L and $3L$, respectively, and this angular change.

The external work is $0.5P(1.5L\theta) + P(L\theta/4) + P(3L\theta/4) = 7PL\theta/4$. Equating the internal and external work and solving for P yields $P = 2.29M_p/L$. An equilibrium check shows this is the correct mechanism, since nowhere in the frame is the plastic moment exceeded.



17. AXIAL FORCE, P, tends to reduce the moment capacity, M_p, of a beam to some value, M_{pc}. The stress distribution on a section can be decomposed into two components—one due to axial load and the other due to bending moment. The sketch illustrates the case where the neutral axis lies in the web. For that condition, $P = 2s_y y_c t_w$ and $M_{pc} = s_y(Z - t_w y_c^2)$. Hence, $M_{pc} = M_p - P^2/4s_y t_w$. Similarly, a formula for M_{pc} can be developed for the case where the neutral axis lies outside the web.

For design purposes, axial load can be neglected when P is equal to or less than $0.15\ P_y$ (the axial load causing yielding to occur), with an error of less than 3% for wide-flange sections. For larger values of P, the modified plastic moment can be computed from

$$M_{pc} = 1.18\ M_p(1 - P/P_y)$$

Tests show that the presence of high shear stress locally does not reduce bending capacity. Within permitted web depth-thickness ratios, buckling is not initiated even by relatively large shear strains, since strain hardening occurs, providing the necessary resistance. However, the AISC design rules will limit shear due to ultimate load at any point along the beam to the cross-sectional area of the web multiplied by 19,000 psi.

To prevent local buckling due to any type of loading, limiting flange width-thickness ratios and web depth-thickness ratios will be prescribed and will be somewhat more restrictive than those in present (elastic theory) design specifications. However, most rolled shapes (some 95% of the total available) have dimensions that come within these limiting ratios.

• **What safety factor to use?**—T. R. Higgins, AISC director of engineering and research, develops a suggestion for the safety factor in plastic design by the following reasoning:

Under present-day specifications, with working stress specified at 20 kips per sq in., ultimate load for a simple beam will be about $1.14\ s_y/20$ times the design load. A statically loaded continuous structure, therefore, should be designed for the same factor, since the likelihood of overload is the same. With $s_y = 33$, the safety factor should be 1.88; i.e., ultimate load should be at least 1.88 times the design load.

When current specifications permit a one-third increase in working stress for such conditions as combined wind and gravity loading, the safety factor for plastic design should be $1.14 \times 33/26.7 = 1.41$. However, the members should not be smaller than required to support gravity loading, alone with a safety factor of 1.88.

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New "Euc" has struck capacity of 24 yds.

This Model TS-24 is Euclid's latest development in Twin-Power Scrapers. It has a struck capacity of 24 yds. and 32 yds. heaped at 1:1 slope. Tractor is powered by 300 h.p. engine with 3-speed Torqmatic Drive. The rear axle is driven by a 218 h.p. engine with separate torque converter and semi-automatic transmission. Hydraulic steering provides full 90° turns. Tires are 27.00 x 33 standard with 33.5 x 33 optional. Top speed with full payload is 26 mph. using standard size tires.

Pipeline Padding Costs Reduced More than 50%

ARIZONA — Western Pipe Line, Inc. of Austin, Texas is laying 245 miles of 34" pipe across northern Arizona and a 141 mile connection of 20" pipe to Phoenix. It's a tough job across rugged terrain and requires equipment that can take steep grades and rough going.

The pipe must be protected with a 6" blanket of selected material—about one yard of dirt per lineal yard of pipe. Two "Twin" Scrapers have been working on the padding operations hauling material from 1200 ft. to several miles over grades as much as 39%. The contractor reports that the production and work-ability of these scrapers have cut padding costs in half as compared with former methods used.

Rush Job Finished 4 Months Ahead of Schedule

SOUTH DAKOTA—J. H. Beckman Construction Co. of Sioux Falls was awarded a grading contract for 6.8 miles of U. S. Route 16 that involved 360,500 yds. and had to be completed in 6 months. Four Euclid Twin-Power Scrapers, supplemented by 3 other scrapers, some crawler equipment and 3 motor graders, were put on the job and worked 11 hour shifts six days a week.

Because of their Twin-Power and all-wheel drive, the "Eucs" worked independently without assistance from pusher tractors. On one cut they self-loaded 20 bank yards of gumbo and shale in about 45 seconds — completed the 870 ft. haul cycle over cut and fill in an average of 2.83 minutes. Hourly production was 353 yards. Self-loading sand and top soil in another cut the Euclids averaged 21.6 yards in less than a minute. The complete 600 ft. cycle took about 2½ minutes and hourly production averaged 415 bank yards.

With these versatile, fast dirt-movers on the job, grading was completed far ahead of the rush schedule.

Versatility Pays Off at Noxon Rapids

MONTANA — Two Twin-Power Euclid Scrapers are being used by Morrison-Knudsen Co., Inc. at Noxon Rapids Hydro-electric Project on the Clark Fork River in Western Montana. They are building roads, helping with excavation at the dam site and supplementing a large fleet of other Euclid hauling equipment.

Working in heavy wet clay or in sand and gravel the "Twins" pick up loads of 18 yds. or more without help from pusher tractors. With big single tires and all-wheel drive, they work in soft and rutted areas and have plenty of power to move heaped loads over long hauls at fast travel speed.

Owner says "Euc" Twin-Power Scrapers have revolutionized dirt moving in the West

SOUTH DAKOTA — Harris Construction Co. moved 1,000,000 yds. of shale for a railroad relocation job at Mowbridge with only 6 scrapers one motor grader and one roller. That's probably as small a spread of equipment as you'll ever find on a project of this size yet production averaged 13,000 yds. per 10-hour shift. Cycle time on a 1600 ft. haul was about 4 minutes . . . each "Twin" averaging 225 yds. per hour. Owner Ken Harris has found the Twin-Power Scraper the most efficient dirt mover he's ever used and this railroad job wasn't the first time he had parlayed Twin-Power into low cost high production.

In April of 1956, Harris set a new earthmoving record on Montana highway work by moving 90,000 yds. on hauls up to 4000 ft. during six 10-hour shifts. At the same time he was working on the road job, Harris had a 1,200,000 yd. subcontract at Glasgow Air Base, 26 miles away. He moved his "one man earthmoving crews" from one job to another according to weather conditions and work requirements. The "Eucs" were used to the best advantage all the time because there was only an hour's travel time involved and they worked independent of pusher tractors normally needed by scrapers for efficient operation.

3 Million Yard Waste Dump Moved by "Twins"

ONTARIO, CANADA — Moving an old waste dump from a drained lake bed presented a tough problem for Steep Rock Iron Mines, Ltd. The material, consisting of wet silt, low grade ore, stone and boulders, was heavy—about 3200 lbs. per yard. Hauling conditions were difficult because of the soft, spongy footing so it seemed that the job would have to be truck-shovel operation. In spite of these adverse conditions, a Twin-Power Scraper was demonstrated on a haul of 5800 ft. round trip with grades up to 10%. Performance was so outstanding that four machines were purchased and are now effecting major savings on an almost "impossible" scraper job.

Twins Tackle Tough Road Job

VIRGINIA — Contractor Robert T. Main used a Twin Scraper and TC-12 Crawler in a highway cut that had stopped other scrapers because of the extremely soft footing. This combination of Euclid "Twins" had plenty of power, traction and flotation to get the job done efficiently—it replaced a dragline that was brought in when it looked like the job couldn't be done by scrapers.

(ADVERTISEMENT)

movers

TWIN EDITION ★ ★

RECORDS

and cost advantages any other equipment

Improved Model of "World's Most Powerful Crawler"

Euclid's Model TC-12 Twin Crawler now has more horsepower, more track area and more accessibility than any other production tractor. It is powered by two 218 h.p. engines with separate Torqmatic Drives for each track—a total of 436 h.p.! Standard shoes are 27" wide and there are now 8 track rollers to give still better balance with heavy duty attachments.

Ten "Twins" Move Nearly 40,000 Yds. Per Day

NEBRASKA — Western Contracting Corp. of Sioux City, Iowa, used 10 "Twin" Scrapers and 5 Euclid TC-12 Crawlers to move 3 million yards on a plant site grading project with a 5 month completion limit. Equipped with 6 yard sideboards and push loaded by the big "Twin" Crawlers to get maximum production, the scraper fleet worked 20 hours a day and moved close to 40,000 yds. daily on hauls of 1500 feet.

This leading contractor's belief that Euclid Twin-Power is tops for low cost earthmoving is backed by lots of previous experience on high production jobs. At Ft. Randall Dam they used a fleet of 30 Model LLD 50-ton Rear-Dumps powered by two 300 h.p. engines. For a 7 million yd. Indiana Turnpike contract Western purchased 15 Twin Scrapers and 5 Model TC-12 Euclid Scrapers. After finishing this big job, part of the Twin fleet was assigned to Oahe Dam while others tackled a highway project in Michigan. This well-known contractor is so "sold" on Euclid Twin-Power Scrapers and Crawlers that estimates and bids are made on the basis of the low cost production that "Twins" provide.

Couldn't Believe His Own Stop-Watch

IOWA — When a contractor-visitor to Wilbur Nielsen's road grading job made a time check on 3 Twin-Power Scrapers he sent to town for another stop-watch because he couldn't believe the time registered on the one he'd used!

The "Twins", equipped with 6 yd. sideboards and push loaded by a torque converter crawler tractor, got loads of better than 24 yds. in an average of 50 seconds. In spite of the mile and a half long haul, the three scrapers averaged 336 yds. per hour. Working 10½ hour shifts six days a week, with an availability record of 95%, Nielsen's "Eucs" completed the grading well ahead of schedule.

"TWINS" are making headline news!

Twin-Powered Euclid Equipment is out-performing all other equipment by a wide margin — the profit margin — on all kinds of earth-moving. With "Twins" in your fleet you'll have a bidding advantage that can pay off in more jobs and more profit. Get the facts from your Euclid dealer and you'll know why owners everywhere have proved Euclids are your best investment.

EUCLID

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

New Shields

Crews in Los Angeles are driving a 12 ft horseshoe tunnel through sand at 24 hr rates as high as 153 ft for a single heading.

Making this possible is a combination of ideal ground conditions and proper equipment. The ground is easily excavated dry sand. And key piece of equipment at each of the two headings is a hydraulically jacked tunnel shield.

The job is part of the North Central Outfall Sewer—a major phase of a $60 million sewage works program aimed at keeping pace with the swift growth of the Los Angeles area.

The new main trunk sewer line will relieve overloaded lines and bring a greater flow to the Hyperion treatment plant. The 8 mile line will have a finished diameter of 9½ ft and includes 5.4 mi of tunnel and 2.6 mi of open cut.

◀ **TUNNEL SHIELD** supports sandy formation for Los Angeles sewer tunnel. Shield is powered by hydraulic jacks working against tunnel ribs.

◀ **SAND IS LOOSENED** by hand methods for removal by mucking machines. When material is tight, air spades are used.

CONVEYOR BELT takes material to muck cars. Belt is supported by rails mounted on brackets on the tunnel ribs.

Speed Tunneling Through Sand

The fast progress has been made by crews of a joint venture of the Arundel Corp., L. E. Dixon Co. and Kemper Construction Co. that was awarded a $6,197,000 contract in May, 1956. The work includes 20,500 ft in this one tunnel, plus 900 ft of open cut and 1,500 ft in an additional tunnel.

Also engaged in constructing the North Central Outfall Sewer is Baker-Anderson Corp. who were awarded a $4,930,000 contract in September, 1956.

This work includes two major tunnels—the longest being 6,700 ft—and three smaller tunnels plus some open cut work. Both contracts are due for completion in May, 1958. An additional 1,500 ft of the outfall located at the Hyperion treatment plant will be included as part of work on modification of the plant.

• **Through running sand**—The tunnels on the North Central Outfall penetrate a sandy formation with occasional pockets of gravel. But in spite of having as much as 90 ft of cover, the sand is usually loose enough to move by hand shovel. Where this is not the case, air spades are brought into action.

Unsupported, the sand would cave. And there is some tendency for it to run at the tunnel face.

The tunnels pass under residential areas and also under the Los Angeles International Airport. So far, however, there have been no surface indications of the tunneling work. The alignment was so selected as to miss the most severe part of a fault zone that penetrates the Baldwin Hills area of west Los Angeles.

Arundel-Dixon-Kemper started at the north portal using hand methods for placing the necessary supports. This involved use of 6 in., 20 lb, wide-flange ribs placed on about 5 ft centers.

Spilling was 3x8 in. timbers driven ahead of each set of ribs to prevent the material from caving. Progress by this method was relatively slow, amounting to about 15 ft per shift.

• **Shield makes for speed**—By the time the contractor was ready to open the south portal, a tunnel shield was worked out that was specially adapted to this material. The shield—fabricated in the Kemper Construction Co. yards—worked so well that almost immediately a second shield was installed at the north heading of the tunnel. Progress was substantially improved by use of the shield from about 45 ft per heading in 24 hours to an average daily rate somewhat less than the 153 ft maximum. The job is on a 3 shift, 5 day week basis.

Besides making faster progress, the shield conserves support material. It is possible to use 4 in., 13 lb wide-flange ribs in place of the 6 in. And the shield permits installation of 2x8 in. lagging placed solidly around the tunnel arch. The lagging is only a single layer—a double layer was required when spiling was used. Even so the job consumes 18,000 fbm of lumber a day.

The shield has six hydraulic jacks that inch it forward as material is dug out at the heading. The leading edge of the shield extends further out at the top than it does at the bottom. The jacks push against the previously placed 4 in. wide-flange rib. The ribs are braced by 3x8 in. timber collar braces that carry the jack thrust back into other ribs. These 3x8 members that brace between ribs must later be laboriously cut out as the design calls for a minimum thickness of 10½ in. of concrete—it is possible to include steel ribs in the concrete but not timbers.

• **Jacks move shield**—The shield is maneuvered by the jacks. Should the tunnel tend to get off line, the material is dug away in front of the appropriate edge of the shield, and the jacks on that side are operated. It takes the full time of one man on each shift to operate the shield.

Surveyors from the City of Los Angeles inspection crew set reference points twice a day. But with the extremely fast progress the heading often gets substantially ahead of the reference marks.

After the shield has progressed slightly more than 4 ft beyond the last set of ribs, the jacks are retracted and a new rib together with its lagging is positioned. The lagging is dadoed in a carpenter shop located just outside of the tunnel portal so it will just fit the 4 ft between ribs.

• **Air powers job**—Power for the shield comes from a hydraulic pump driven by an air motor. All other equipment at the heading is also air powered. For this purpose a single compressor is located outside the portal (750 cfm capacity at the north portal and 1,100 cfm at the south).

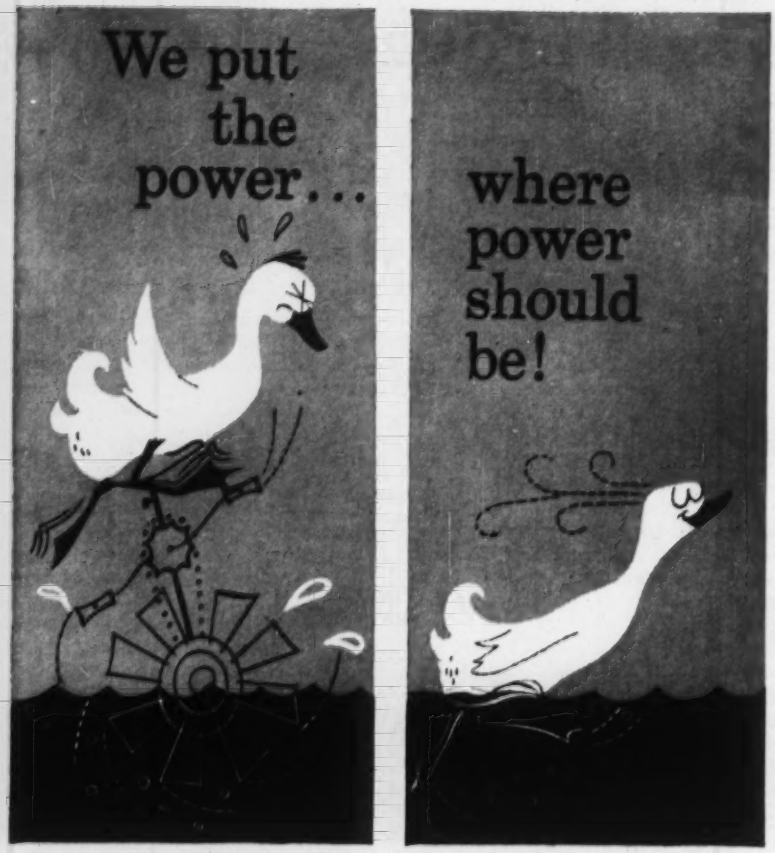
The sand is mucked by a small, air-powered, crawler-mounted, overshot loader that dumps onto a hopper conveyor belt. The 30 in. wide belt carries the material to 4 cu yd muck cars that are run under it.

The air-powered conveyor rides on rails supported by brackets attached to the steel ribs.

Material removed is about 4.7 cu yd per foot of tunnel. The muck train is

(*Continued on page 48*)

CARS ARE DUMPED by gantry-mounted air hoist. Muck is removed from the tunnel while miners set a new rib and its lagging.

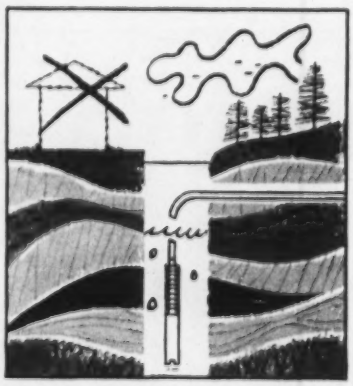


Install SUMO SUBMERSIBLES for maximum water-pumping efficiency

SUMO Submersible Pumps—perfectly aligned, close-coupled motor and pump units—run under water. And right there is the solution to a lot of pumping problems.

You don't need a pump house. Controls and pressure tank can go anywhere. Narrow or crooked wells are no problem. You simply attach a SUMO to the discharge pipe, connect it to your power supply and run it inside the well. Forget long drive shafts, bearing spiders, alignment problems, noise, vibration, adjustments or priming. And forget trouble—a SUMO can't freeze or flood out. It's safe from tampering, too.

Switch on power and expect years of attention-free operation. Only minimum maintenance is required. Spare parts are immediately available from nationwide service centers.



Sumo Submersibles are installed in the well and operate completely under water. Close-coupled pump and motor design assures fully efficient pumping for any water service.

WRITE FOR BULLETIN B1000 for full details and operation data.

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Dept. 1 P. O. Box 983 Stamford, Conn.

SUMO SUBMERSIBLE Water Pumps

. . . the pumps that stand the test of time

taken out of the tunnel and emptied while a steel rib and its lagging are set. On every other trip into the tunnel, the train brings a load of lagging and steel ribs.

The muck cars are a side dump type, emptied by an air hoist mounted on a gantry.

The Baker-Anderson Co. is also using a shield but it is powered by four hydraulic jacks. Their crews are still getting experience. Best single heading progress to date is about 100 ft in a 24 hr shift.

• **Plastic-coated lining**—After the tunnels are completed they will be lined with concrete to 9 ft 6 in. dia. The Arundel-Dixon-Kemper joint venture will use pneumatic concrete placing methods. Concrete will be undertaken this summer and it is expected that the tunnel will be completed substantially before the May, 1958, due date.

The tunnel will be vinyl-plastic-lined for the top 260 deg of the arch. Purpose of the plastic is to prevent deterioration of the concrete due to sewer gases.

To further safeguard the surface of the outfall sewer, it will be ventilated throughout its length by means of fans located at the Hyperion plant. The outfall has two inverted siphons. Ventilation air is carried around the siphons by jumper pipes.

A detailed study has been made of odor control at Hyperion. Air from the outfall sewer as well as from the various elements of the treatment plant will be let to the makeup plenum for the compressor servicing the activated sludge tanks. Thus, the foul air will be "scrubbed" by introduction into the tanks. This has the function of dissolving the hydrogen sulfide in the air.

• **Engineers, constructors** – The entire Los Angeles sewage works program is under the direction of the Board of Public Works, Cushing Phillips, president. The North Central Outfall Sewer was designed by Hyperion Engineers, a joint venture of Holmes & Narver, Inc., Daniel Mann Johnson & Mendenhall and Koebig & Koebig. David L. Narver, Jr., served as project manager for the joint venture.

The Arundel-Dixon-Kemper contract is sponsored by L. E. Dixon Co. with J. P. Williams as project manager. Superintendents are Oris Holman at the north portal and Joe DeMilita at the south portal.

Inspection of the work is under the Los Angeles Inspector of Public Works, W. T. Anderson with Arthur L. Milicov supervising inspector for the entire Hyperion program. B. G. Oglesby is resident inspector on the Arundel-Dixon-Kemper contract.

55% LESS KICK

with the NEW LE ROI shock-absorbing handle

It's the hottest thing on rock drills yet! The new torsion rubber-cushioned handle on Le Roi sinkers cuts out 55% of all vibration normally delivered by air tools to the worker . . . yet doesn't lose an ounce of impact at the bit!

That means a lot less fatigue—higher output per day—bigger smiles at the end of the shift. And workers stay on the job longer when work is eased with better tools.

You get dependability, too. Like all Le Roi Newmatic Tools, the shock-absorbing handle is built for years of service life.

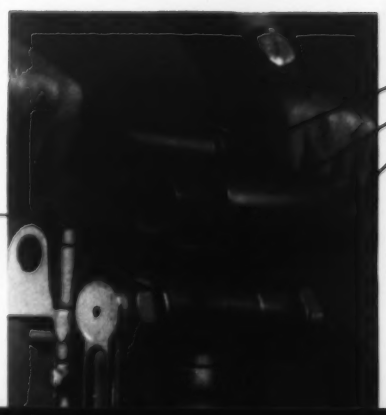
That's a lot of return for a low investment — see these new, new tools at your Le Roi distributor *now*. Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wisconsin

The girl is Virginia DeLee, 5' 8", 124 lbs., 35-22-35

LE ROI NEWMATIC AIR TOOLS

a torsion rubber cushion in the handle - adjustable to suit the operator - dampens most vibrations.

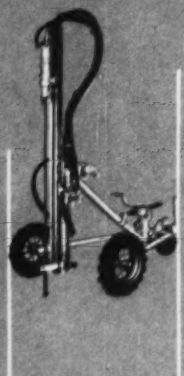
55% of all tool-shock stops here!



. . . and you can wear a wrist-watch, too!

LITHO IN U.S.A.

Le Roi Model DR40 Wagon Drill for deep drilling, hard ground

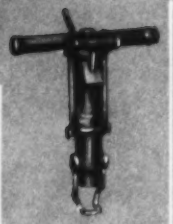


Le Roi Model DR34 with H10 Drill for shallow drilling in average ground (also with H25 Drill for medium drilling in hard ground)

Le Roi Model H111 Heavy-duty Sinker for deep drilling, hard ground (55 lb.)

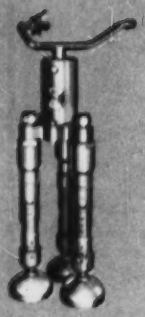
Le Roi Model H10 General purpose sinker for average ground (45 lb.)

Le Roi Model H186 Sinker for shallow drilling (35 lb.)



Le Roi Model 22 Sinker for utility work (17 lb.)

Le Roi Air Operated Sump Pump — capacities to 340 gpm, heads to 70 ft.



Le Roi Model DT11 Triple Hand Tamper for all applications

Le Roi Model 11 Single Hand Tamper for all applications

Le Roi Model C10 Demolition, light-duty Paving Breaker (35 lb.)

Le Roi Model 31 Clay Spade for average ground (18 lb.)

Le Roi Model C18D Clay Spade for hard ground (35 lb.)

Le Roi Model C11 General-purpose Paving Breaker (60 lb.)

Le Roi Model 52 Heavy-duty Paving Breaker for tough concrete (80 lb.)

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SAY LE ROI NEWMATIC!

A complete line of air tools for the construction industry... balanced for operator comfort... air-cushioned for long life... precision built for dependable operation.

Le Roi Division, Westinghouse Air Brake Co.
Milwaukee 1, Wisconsin

AT-1238

Rainfall Odds

Maps give the statistical probabilities of rain

Rainfall probability data in a form quite meaningful to the construction industry have been worked up by a Texas weather consulting firm.

Ordinary state road maps are overprinted with isograms showing maximum, minimum and median rainfall in inches and number of days with at least 0.1 in. of precipitation. A state would have 39 maps—a "max", "min" and "med" for each month and an average "max," "min" and "med" for the entire year.

The quantities are defined simply: Max is the rainfall that will be exceeded once in five times (or 4 out of 20 times since 20 years of data were analyzed in producing a set of maps for Texas). Min will be exceeded 16 out of 20 trials and med 11 out of 20. On a typical map, intensity isograms are surprinted for every inch or half inch of rainfall, depending upon the region's climate.

These basic monthly and yearly data can be accumulated by standard statistical procedures to provide probabilities for any period of time (the min for April and May is not necessarily the April min plus the May min). Thus contractors, designers and others in rain-sensitive positions can determine the rainfall odds for a given situation. And betting with the odds should prove quite profitable if followed over the long run.

Contractors are expected to find the maps useful in determining how much rainfall to be figured in a bid, planning when and where to start jobs such as highways and pipelines, scheduling inside and outside work and scheduling deliveries of rain-affected materials and equipment.

Designers of roads, pipelines, power lines, dams, canals and airports may also find the maps useful.

The maps for Texas show a number of unexpected conditions. In some months there are often more days of rain (0.1 in.) in dry west Texas than in the eastern part. Location of the maximum number of days for the state does not coincide with location of the maximum number of inches. And there are many strong gradients of rainfall, or large changes in small distances.

Gulf Consultants, Houston, is the originator of the different approach to weather forecasting described herein and plans to offer maps for many states besides Texas. Ledolph Baer and John C. Freeman are principals.

Getting Fish Up and Down

Helping fish on their way is the object of two new facilities in Washington State.

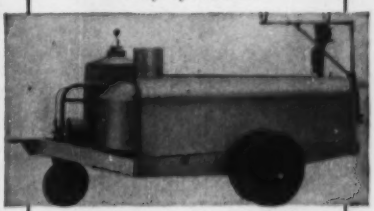
The first (above) is part of a program by the Washington State Department of Fisheries to clear an important salmon-spawning stream of obstacles to fish passage. To bypass previously impassable falls on Cedar Creek, a cut has been blasted through solid rock and the cut then fitted with concrete sides and baffles. The 150-ft-long fish ladder cost $59,000. It will open up 15 miles of productive salmon-spawning water.

Grace
ASPHALT AND COMPACTION EQUIPMENT

Roadsweepers, traction, engine-driven or tractor-mounted

Sheepsfoot rollers

Chip spreaders



Circulating asphalt heaters

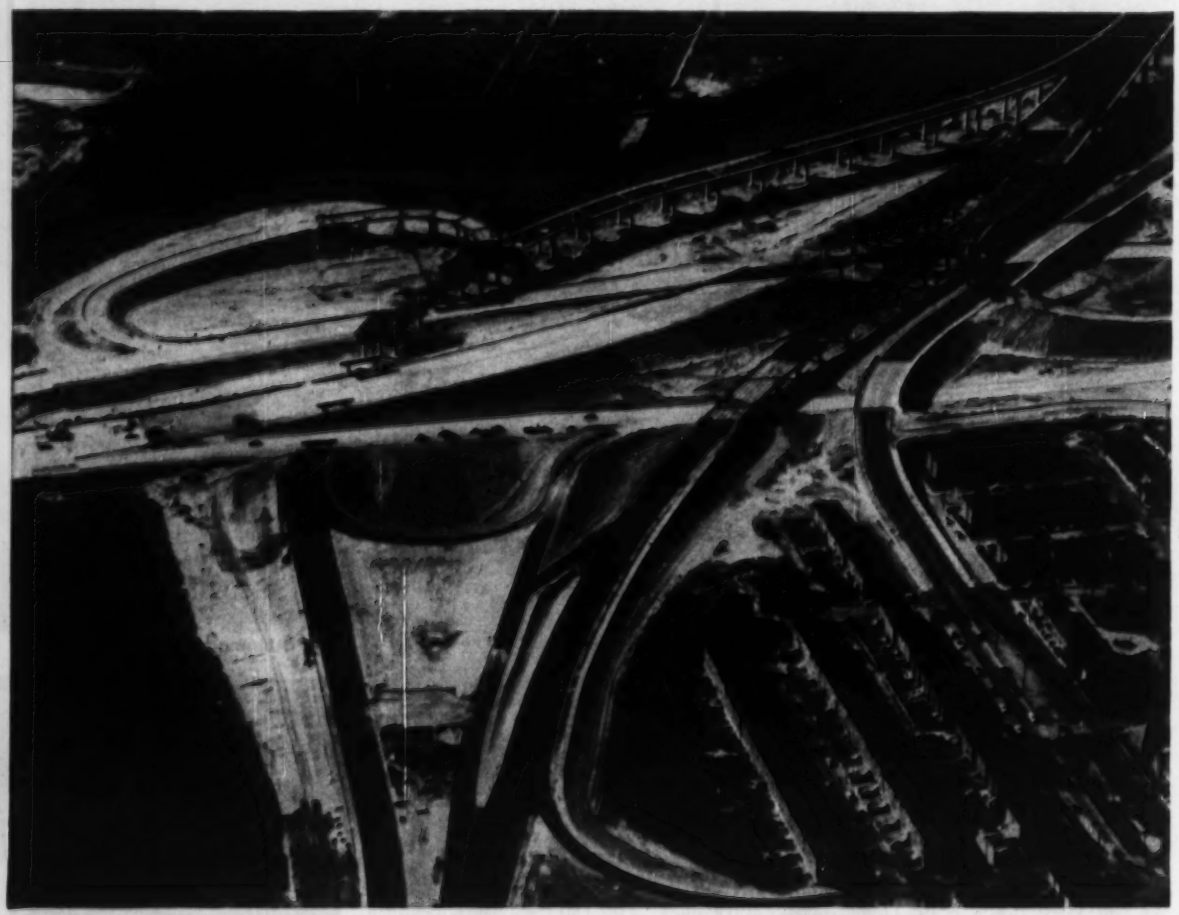
Automatic oil heaters for hot plants

Pneumatic rollers, self-propelled or trailed

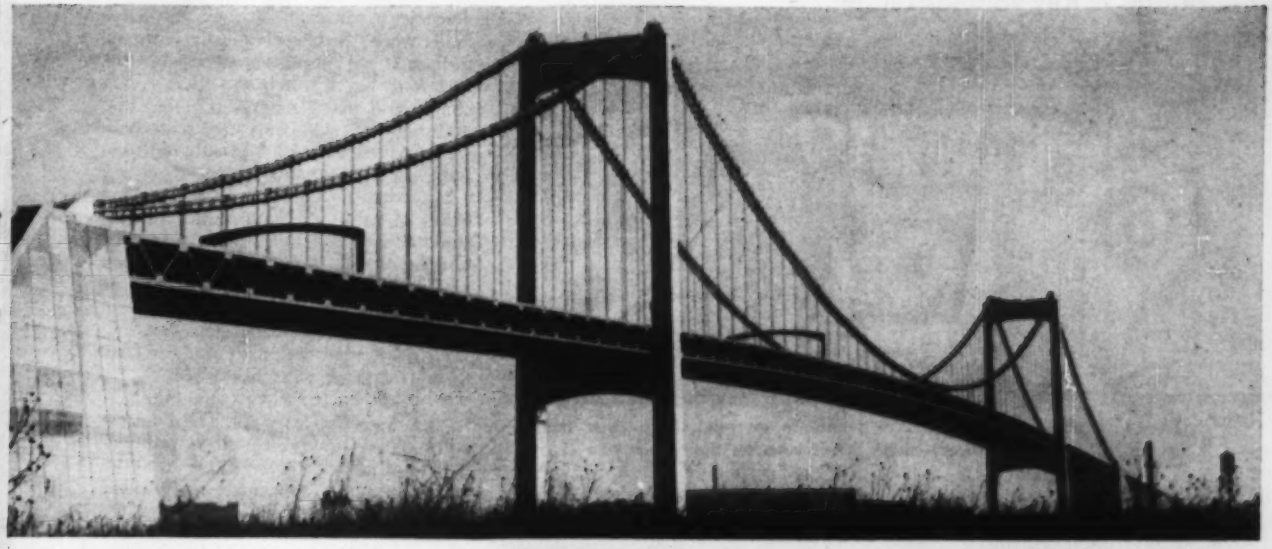
W. E. GRACE MFG. CO.

Nearly ready for opening, the Walt Whitman Bridge between Philadelphia and Gloucester City, N. J.–world's eighth largest suspension span—is more than an engineering feat.

New Bridge Is Key to Redevelopment



NEW JERSEY SIDE of the highly complex bridge approach will have connections to serve Gloucester City, Fairview and main highways leading to all South Jersey points. The principal connecting roadway will be the North-South Freeway.



# of Two Cities

The monumental Walt Whitman Bridge over the Delaware River, connecting South Philadelphia and Gloucester City, N. J., is not "just another bridge." Nor is it notable solely because of the dimensions of its span and the complexity of its approach roads system.

Its true significance lies in the fact that—along with the older and more massive Benjamin Franklin Bridge about 3¼ miles upstream—it will become a main facility for the swift transfer of people, goods and services between the two states. And it will contribute mightily to the convenience and economic benefit of the entire port area.

The $90 million bridge and its approaches have been under construction by the Delaware River Port Authority for three years and eight months (ENR June 2, 1955, p. 51), and the target date for opening to traffic is late in May.

Contracts let thus far involve expenditures totaling $71.8 million. Engineering, administrative and real estate costs are listed at $12 million, making the total commitments at this time about $83.8 million.

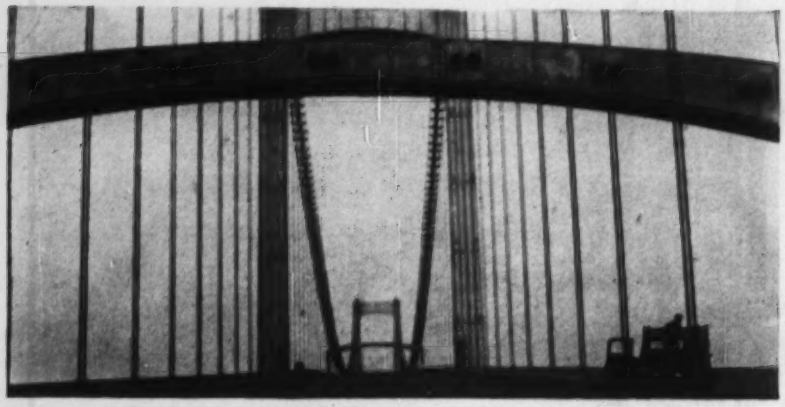
It is the eighth largest suspension bridge in the world, and with its 5¾ miles of approach roads, is one of the longest bridge systems in the world.

In combination with the other highway improvements now either under construction or in the planning stage, the new crossing should aid materially in the relief of traffic congestion in the Philadelphia-Camden urban area.

By detouring a highly-congested area

THE PHILADELPHIA APPROACH will be a wide, limited access highway connecting with principal city streets and traffic arteries in the west and southwest sections.

. . . Bridge is Key to Redevelopment



ON THE BRIDGE there will be seven lanes divided by overhead traffic lights, that will permit a pattern of reversal to provide as many as five lanes for the heavier flow of traffic.

of Camden County to the north and by slashing across an equally congested section of South Philadelphia, the Walt Whitman Bridge complex will provide, in effect, a limited access highway connecting directly with the Port of Philadelphia. The man hours of time and dollars of operating costs that shippers may save as a consequence is hardly calculable.

This saving becomes particularly significant in the light of the march of industrial development in the tidewater section of southern New Jersey and Delaware County, Pennsylvania.

There already has been a mounting realization of the impact the new river crossing will have upon residential and industrial developments of areas on both sides of the river—areas that heretofore have suffered due to relative remoteness from the main stream of interstate commerce. Many new business areas are already developing.

On the one hand, thousands of visitors to the shore resorts of South Jersey will find the new bridge a comfortable and convenient means of access to their summer homes and favored beaches; on the other, major airlines already are keenly aware of the new accessibility of Philadelphia's International Airport to South Jersey patrons.

It is estimated that the bridge will carry 15 million vehicles in its first full year of operation. Approximately 11 million of these are expected to be diverted from Benjamin Franklin Bridge and the remaining 4 million, new traffic.

• **Complex approaches** — Walt Whitman Bridge approaches are wide, limited access highways that—with the exception of one stop at the toll plaza on the Philadelphia side—will permit motorists to drive the entire length without encountering a stop light.

The Philadelphia approach is to extend 3.5 miles from the anchorage westward through the toll plaza at Fourth St. to a connection with Vare Ave. near 28th St. Other connections with Philadelphia will be available from points near Randolph, Seventh and Broad Streets, Penrose and Passyunk avenues.

Due to uncontrollable circumstances, the entire stretch of the Philadelphia approach system will not be accessible to motorists when the bridge is opened to traffic. Initially, the approach will be open only as far west as Broad St. Although all of the steel required for completion of the entire project was on order, the nation-wide steel strike of July, 1956, resulted in a serious delay in delivery of some of the steel members, particularly for the complicated viaduct and interchange structures in the vicinity of Passyunk Ave.

The affected portion of the Philadelphia approaches, slightly over 1¼ miles in length, extends westward from Broad St. to approximately 28th St. and Vare Ave.

A large portion of the land over which the Philadelphia approach passes was for many years a city dumping area and a railroad right-of-way.

About 2.5 million cu yd of sand and gravel were pumped from the bed of the Delaware River through pipelines to fill a portion of the railroad depression and to create huge stockpiles for filling and elevating the approach right-of-way.

Some of the areas—once city dump lots—were found to contain material that was not structurally sound as foundation matter. Much of this material was fine ash and general debris. The unsuitable material was excavated and removed from the area, and a suitable stabilizing sand from the river was put on the right-of-way as surcharge for the future road bed. The subgrade was strengthened with compacted layers of crushed stone. Then a durable asphaltic concrete road was constructed and finished with 2 in. of asphalt wearing surface.

The New Jersey approaches were built on land that was formely marshes. The vast expanses of swamps and marsh lands were filled hydraulically with 3.2 million cu yd of sand dredged from the Delaware River which was used as surcharge and base. After settlement and draining out was complete, road beds were formed and the road subgrade was built up with crushed stone.

An asphaltic concrete road later was built on the subgrade and finished smooth with 2 in. of asphalt surfacing. On the elevated areas, such as the overpasses, reinforced concrete was used for the road decking and this was, in turn, covered with an asphaltic finish so that the entire road length would be uniformly surfaced with like materials.

The approaches have connections to serve Gloucester City and the Fairview section of Camden as well as principal highways leading to and from all South Jersey points. The main connecting road on the New Jersey side is the North-South Freeway, being built simultaneously with the bridge by the New Jersey Highway Department. The Port Authority is sharing the costs of certain sections of the freeway, which eventually will provide a parallel highway to the Black Horse Pike from Camden to Turnerville.

Eastward of the Freeway there is an approach for connections to and from Crescent Boulevard and Black Hore Pike, just south of the Fairview traffic circle. The Freeway will connect with Morgan Boulevard.

The highly complex New Jersey approach roads system will be ready for traffic in its entirety when the bridge opens.

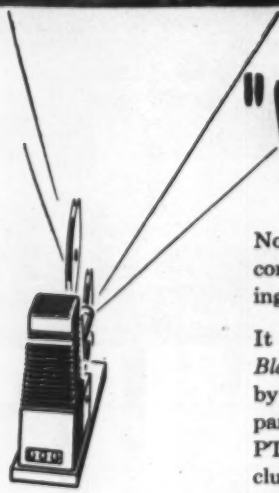
• **Big bridge**—A total of 36,500 tons of steel was required for the superstructure from anchorage to anchorage. Total concrete in the anchorages and river piers is 221,572 cu yd, the equivalent of that needed for a two lane highway, 70 miles long.

The main span, from tower to tower, measures 2,000 ft. The side spans, from towers to anchorages, are each 770 ft long. The bridge roadway, from curb to curb, is 79 ft., 2 in. wide and will have seven traffic lanes with a pattern of reversal to provide as many as five lanes for the heavier flow of traffic.

The towers are 378 ft above mean high water, about the height of a 30 story building. The cables the towers support are each 23½ in. in dia and have a total weight of 4,500 tons. Each cable, as it is now in place, measures 3,845 ft from anchorage to anchorage. Each contain 11,396 wires.

The bridge roadway, which is hung from cables with 61,700 ft of suspender ropes, gives 150 ft vessel clearance at its center. The decking is of reinforced concrete construction topped with an asphaltic surface.

"We're blasting near you"



Now you can gain better public relations in communities where you are blasting by showing an interesting, informative film, in color!

It works, too. The film, entitled, "*We're Blasting Near You*" has already been shown by contractors and quarry operators in many parts of the country, to audiences including PTA groups, civic organizations and service clubs.

The movie tells why blasting is necessary, and explains the steps you are taking to "be a good neighbor." It shows how millisecond delay techniques eliminate the old-fashioned, jarring explosions of the past, and how modern blasting methods keep noise, vibration and flying rock to a minimum.

This unique film is accompanied by a kit of suggested news releases, sample speeches, safety posters and other helpful material—everything you need to conduct a successful meeting in your community. Plan now to get the important public relations benefits from showing "*We're Blasting Near You.*" Write, telling us the approximate dates you'd like to schedule it.

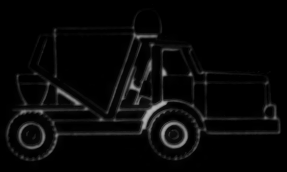
Technical Customer Service Section

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

offices in principal cities

FROM TIMKEN-DETROIT...



today's

BROADEST RANGE OF PLANETARY AXLES

...both steering and rigid!

FOR HEAVY-DUTY SPECIAL EQUIPMENT AND TRUCK APPLICATION

The Timken-Detroit family of advanced design axles now includes a complete range of new planetary heavy-duty axles—with a steering axle operationally matched to each rigid axle in the line.

Versatility, ruggedness, and almost unlimited gear reductions make these new planetary axles the leaders in their line. They are going into use in practically every corner of the world on heavy-duty two- and four-wheel drive prime movers, husky off-road rock and earth wagons, big four-wheel tractors, mining equipment, heavy-duty scrapers, front-end loaders and many other units of heavy-duty equipment.

Years of TDA® research and development have brought these new and exclusive planetary outer-end features: floating ring gears—concentrically mounted ring gear hubs—full-flow lubrication of all bearings and planet gears—special forged bronze planet pinion pins—and an unusually high degree of parts interchangeability. For the newest and finest in planetary axles—depend on Timken!

Only New Timken® Full Planetary Design Brings You These Features for Extra-Long Life, and Extra Dependability:

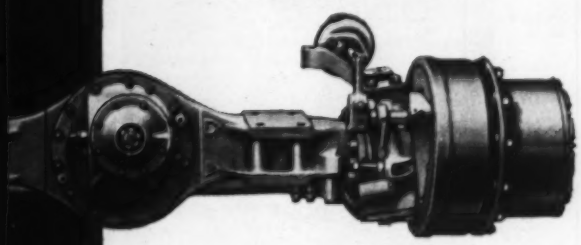
1. NEW FLOATING RING GEAR and hub are two separate pieces. Ring gear is free to float radially. This feature, combined with floating sun gear, assures equal distribution of stresses to all planetary gears, gives longer, trouble-free gear life.

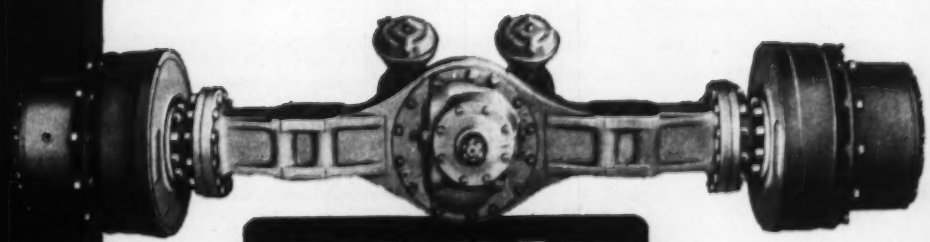
2. CONCENTRICALLY GROUND RING GEAR HUB AND SPINDLE MOUNTING SURFACES ground around a common center assures perfect alignment and fit—plus freedom from bending forces on the hub and spindle splines. Splines absorb only torsional stresses from the ring gear and transmit them to the housing.

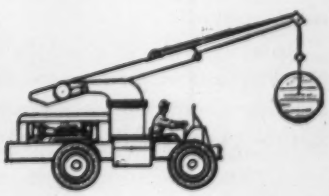
3. SPECIAL FORGED BRONZE PLANET PINION PINS of premium alloy bronze for longer, trouble-free operation. Rifle drilled lubrication channels and machined lubrication flats assure full time lubrication. When cover is assembled pin is locked in place to prevent rotation—resulting in longer pin life.

4. FULL-FLOW LUBRICATION design of Timken planetary axles assures constant flow of lubricants to wheel bearings and all planet gears while vehicle is in operation. Wheel hub and planetary spider pick up oil in the cast reservoirs as they rotate and channel it to all moving parts. When vehicle is not in motion oil is retained in these chambers providing ample initial lubrication.

5. HIGH DEGREE OF PARTS INTERCHANGEABILITY between both rigid and steering axles in the same series. This means a smaller parts inventory, low maintenance costs and more productive time with Timken planetary axle equipped vehicles.







TIMKEN Detroit AXLES

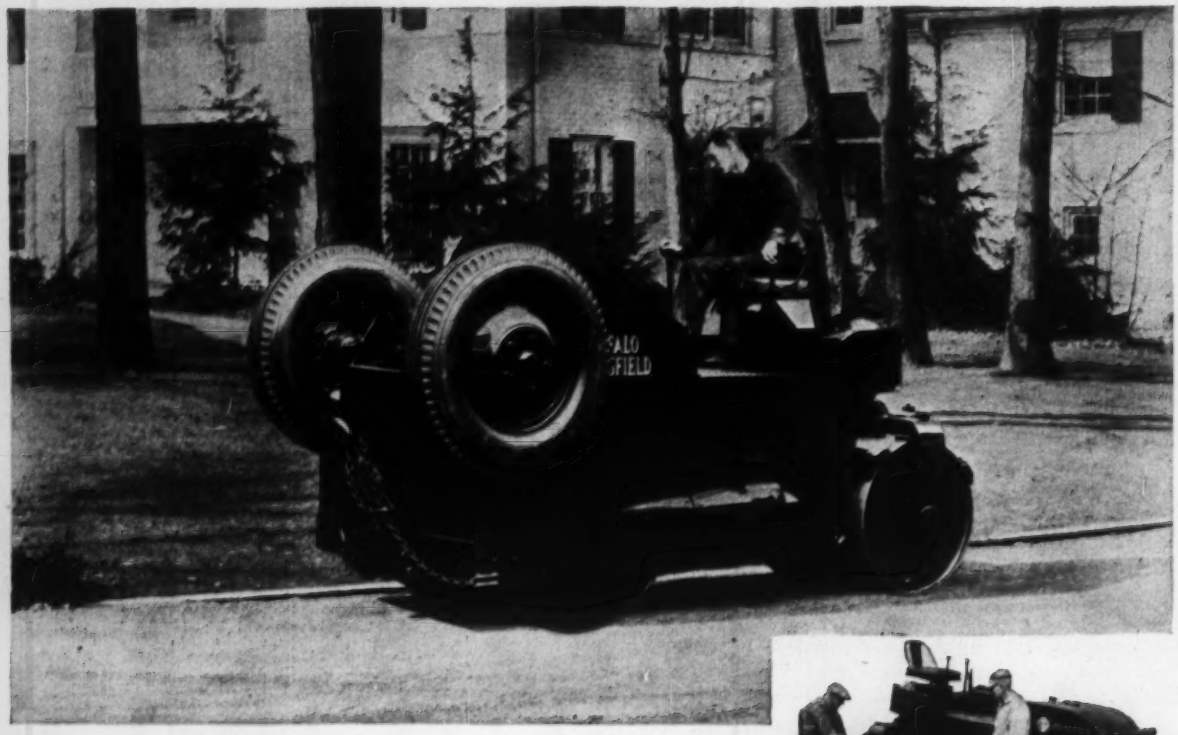
ROCKWELL SPRING AND AXLE COMPANY

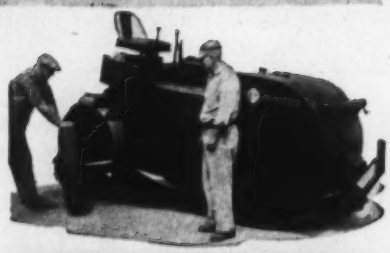
Accepted TDA Standard

Plants at: Detroit, Michigan • Oshkosh, Wisconsin
Utica, New York • Ashtabula, Canton and Newark, Ohio
New Castle, Pennsylvania

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSSES AND TRAILERS

©1957, RS&A Company





The Roller is easily rigged for towing. Inclined wooden blocks are provided for raising guide roll to slip on road wheels and pin them in place.

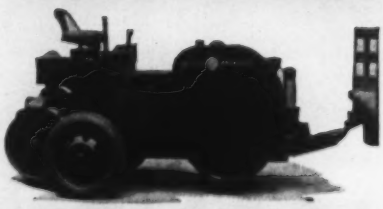
For heavy-duty rolling *PLUS PORTABILITY...use this* BUFFALO-SPRINGFIELD Roller

A conventional heavy-duty roller in construction and performance, this 3-5 ton Tandem Roller, when equipped with the Towing Attachment*, is easily transported from job to job. All essential design features of the larger Buffalo-Springfield tandems, *plus portability*, make this particular roller especially popular for handling a large variety of smaller rolling jobs.

Driveways, sidewalks, parking and playground areas, patching and light finishing work are finished fast . . . and the Portable roller is ready for new work at a different location, with minimum time lost.

Rubber tired road wheels are carried out of the way, on a bracket over the drive roll. When the roller is working, there are no tire treads to mar surface materials or produce uneven surface compaction. For heavy-duty roller performance, plus the economy of using *one* roller quickly at scattered locations, get a Buffalo-Springfield *Portable* Tandem Roller.

See your Buffalo-Springfield distributor now, or write for Bulletin S-58-49 for complete details.

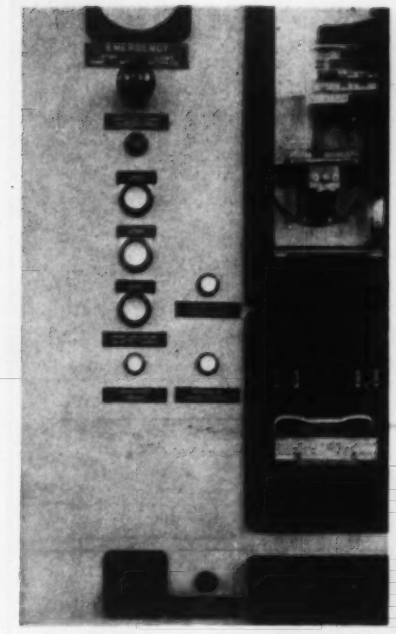


Towing hitch is quickly engaged with pintle on towing vehicle. Hand-operated hydraulic jack installed as part of the towing attachment is employed to raise the drive roll off ground.

*Towing Attachment is available as optional equipment.

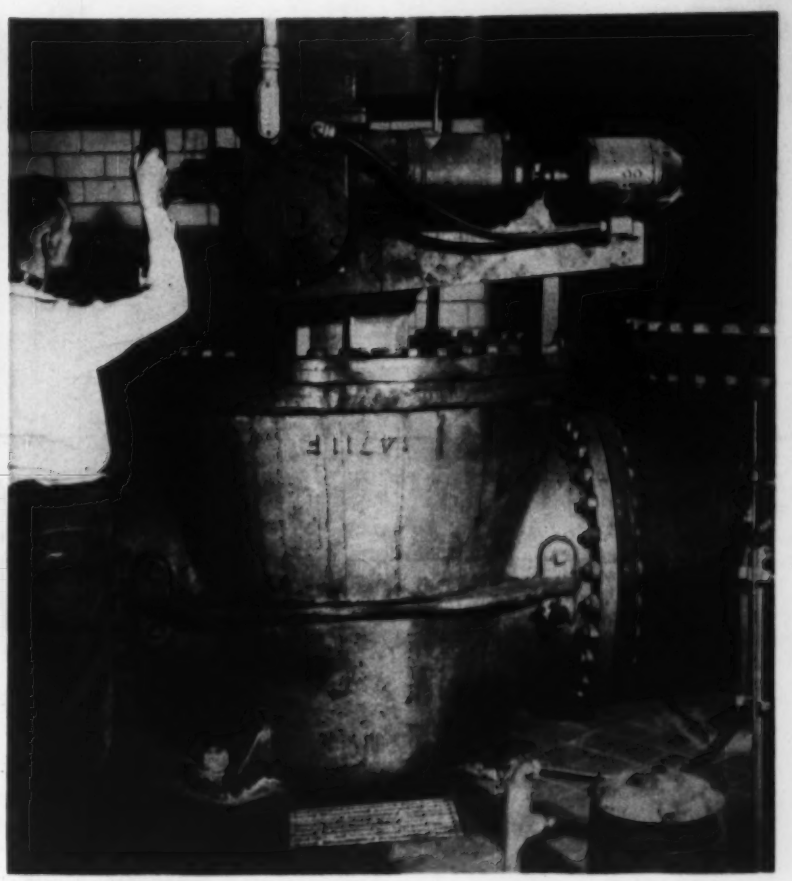
BUFFALO-SPRINGFIELD ROLLER CO.

DIVISION OF KOEHRING COMPANY · SPRINGFIELD, OHIO



▲ Pushbutton control board . . .

. . . and compact motor unit ▶



Replace hydraulic system's pipes and pistons in two Philadelphia sewage pumping stations

Discharge Valves Operated Electrically

By L. Kusner
Electrical Engineer
Philadelphia Water Department

Electric motor-driven discharge valves have been installed in two large sewage pumping stations in Philadelphia where low city water pressure precluded use of conventional hydraulic cylinders without pressure accumulating equipment. And insufficient space made use of accumulators awkward.

In comparison, the electrical operators, 12 in all for 30 in. rotary valves, provide cheaper and more reliable operation, ability to throttle pump discharge and an estimated cost saving of $50,000 at each 6 pump station.

The two involved, the Southeast and the Central Schuylkill Pumping Stations are key components of Philadelphia's recent clean-up program (ENR Mar. 8, p. 73). Both are equipped with six vertical centrifugal pumps apiece. Each pump is rated at 45 mgd at 41 ft head and driven by a 400 hp, 2,400 v synchronous motor. Manually operated 36 in. gate valves are on the suction sides of the pumps.

The 30 in. discharge valves (S. Morgan Smith Co. Roto-Valves) have been equipped with dual-motor operators, standard Limitorque units made by the Philadelphia Gear Works Company. Each operator includes a ½ hp, 208 v ac motor for normal operation and a 1/20 hp 125 v dc motor on the same shaft and geared limit switches for control. The dc motor is for emergency close operation.

• **How it works**—During normal starting of a pump the discharge valve remains closed until the pump motor reaches synchronous speed. Only at this point can the valve motors be started, this requires pushing a button. If operating personnel fail to open the valve within 3 min after the pump motor starts, a relay automatically shuts down the pump. The valve requires 20 sec to open fully.

When pumps are running, the electric operator enables the discharge valve to be used for throttling. For normal stopping, the discharge valve is first closed completely by pushbutton to prevent line surge shock. Then a circuit breaker for the pump motor trips.

When pumps must be stopped immediately, a separate emergency circuit can be actuated by pushbutton to stop the pump motor and start the valve motor closing operation simultaneously. Piping, of course, is subjected to some line surge shock at these times, but damage to pump parts is prevented.

Both pumping stations use electric power from a 13.2 kw dual-feeder primary. Should the normal feeder fail, the reserve feeder is cut in automatically after 1.5 sec by a standard 125 v dc transfer system powered by a 95 cell storage battery. Normal feeder failure also automatically opens pump motor circuits and closes valve motor circuits so that when the second feeder comes on after 1.5 sec, the discharge valves automatically begin closing. This is completed in time to prevent line surge shock. Following the shutdown, the pumps must be started manually.

In the unlikely instance of complete ac power failure, the 95 cell battery, acting as the equivalent of a hydraulic accumulator system, automatically cuts in to power the dc motors on the valves. Again these are closed in time to minimize line surge.

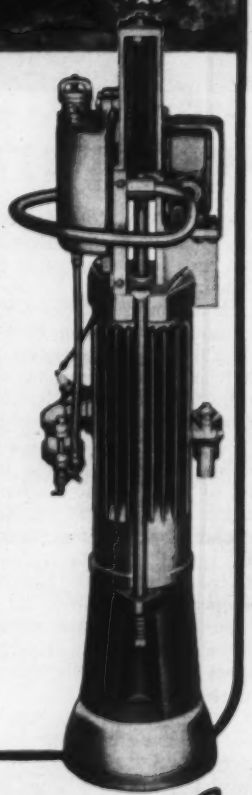
A completely automatic pump re-

GASOLINE BARCO RAMMER

Barco Performance Pays Dividends!

Job Finished on Time!—When project specifications call for SOIL COMPACTION, Barco performance can't be beat! In test after test, Barco Rammers have demonstrated their ability to deliver 95% to 97.5% compaction (modified Proctor Method)—RAPIDLY! EFFICIENTLY! ECONOMICALLY! The Barco Rammer is especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches—on all kinds of construction jobs: Atomic Energy, Air Bases, Hydroelectric Power and Flood Control Dams, Highways, Toll Roads and Freeways, Bridges, Buildings, and Housing Developments. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24", the rate for 18" trench is 360 to 600 feet per hour.

Ask for a Demonstration—We will be glad to arrange a demonstration for you; see our nearest distributor or write. SEND FOR A COPY OF CATALOG 621.



BARCO *Manufacturing Co.*

514-E Hough Street • Barrington, Illinois

CROWDED DRY WELL made space-saving electric valve operators advantageous.

starting system is now being installed in both stations. Following a power interruption when the reserve ac feeder cuts in after 1.5 sec, the pump motors will restart automatically in pairs at intervals of 2 sec.

• **Advantages**—The dual-motor operator has several advantages over a hydraulic cylinder operator with accumulator equipment including air compressors, tanks and oil pumps.

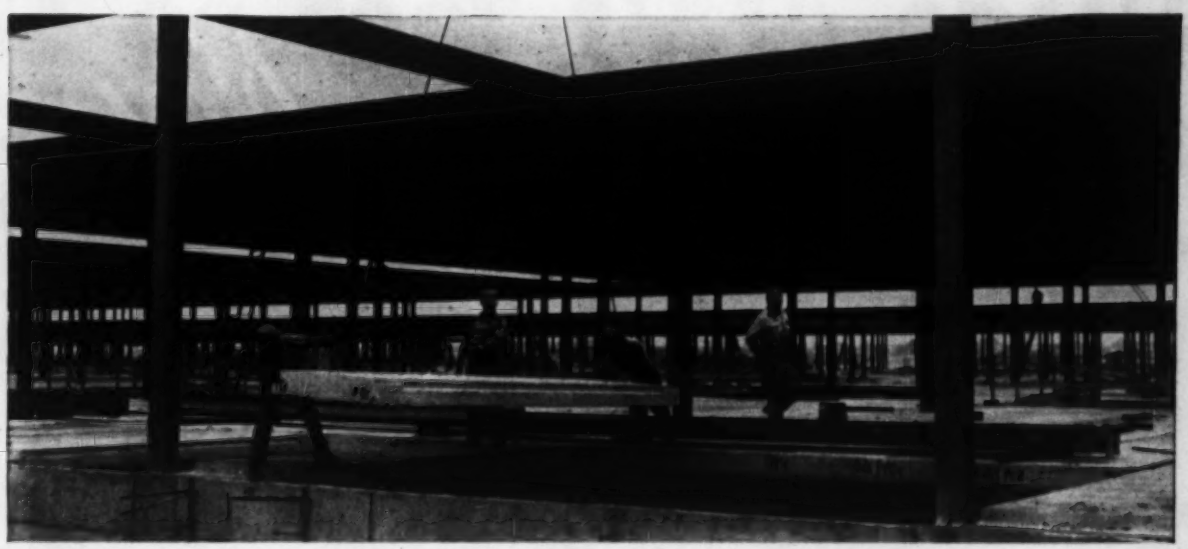
The dual-motor operator is cheaper to install, operate and maintain and is more reliable since opening and closing of discharge valves with the hydraulic system would frequently deplete the accumulator system pressure to the extent where emergency closing would be uncertain.

It should be noted that equivalent emergency closing in the electrical system is provided at no added cost since a storage battery of the same size is required in any case to power the station's automatic transfer system following normal feeder failure.

Another advantage that the Philadelphia installation has over a conventional hydraulic operator is its ability to throttle the discharge valves easily and accurately. This is impractical with hydraulic cylinders since it is usually impossible to prevent piston creepage and consequent variation discharge value.

The Southeast station is now in operation with the Central Schuylkill pumps scheduled for early service.

The work described herein was designed by the author. S. S. Baxter is commissioner and chief engineer of the Water Department; Al Maltman is chief of the design branch.



PRECAST PANEL SWINGS into position in 900,000 sq. ft. floor-area shopping center at Mineola, N. Y. Note the clean working area. Webb & Knapp, Inc., owners, Brugnoni & Boehler, architects; Severud-Elstad-Krueger, consulting engineers. Webb & Knapp Construction Co., supervised field work. George A. Fuller Co., general contractor. Precasting by Precrete, Inc. All are in New York City.

Precasting on-site beats tough time schedule

PROBLEM: Cast and place over 4,800 reinforced-concrete floor panels in less than 3 months, at a giant shopping center in Mineola, N. Y. . . . 20 traffic-choked miles from contractor's home yards.

SOLUTION: Precast all panels on the job site! Thus, eliminate threading 9,600 tons of concrete through traffic jams.

Precasting was started immediately, independent of over-all work schedule and job progress. Completed panels were coded and stockpiled until needed. This eliminated slab formwork and scaffolding within the building and work progressed faster on the uncluttered site.

Each 2-ton panel measured 4'x16', 2¼" thick at center, 9" at flange ends. Ninety molds, arranged end-to-end in double rows of 12, yielded one pour a day—5,760 sq. ft. of panels day in, day out.

The material was a 4" slump, 3,500 psi concrete. Evenly paced delivery direct to the forms, in uniform batches, was assured by using ready-mixed concrete, properly processed in truck mixers of certified design, capacity, mixing speed and water control accuracy.

MOLDS were stripped day following the pour. Because concrete slab strength had reached only 800 psi, panels were removed from grout molds by crane-handled vacuum pad.

STOCKPILED PANELS, coded for quick identification. Precasting permitted contractor to stockpile floor panels during grading, foundation pouring and steel erection.

You have a right to insist on this Rating Plate. It certifies compliance with the high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

BLAW-KNOX CONSTRUCTION EQUIPMENT DIV.
Mattoon, Ill.
CHAIN BELT COMPANY
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CHALLENGE MANUFACTURING CO.
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Waterloo, Iowa
THE JAEGER MACHINE COMPANY
Columbus, Ohio
LeTOURNEAU-WESTINGHOUSE CO.
Indianapolis, Ind.
THE T. L. SMITH COMPANY
Milwaukee, Wis.
WHITEMAN MANUFACTURING CO.
Pacoima, Calif.
WILLARD CONCRETE MACHINERY CO., LTD.
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WORTHINGTON CORPORATION
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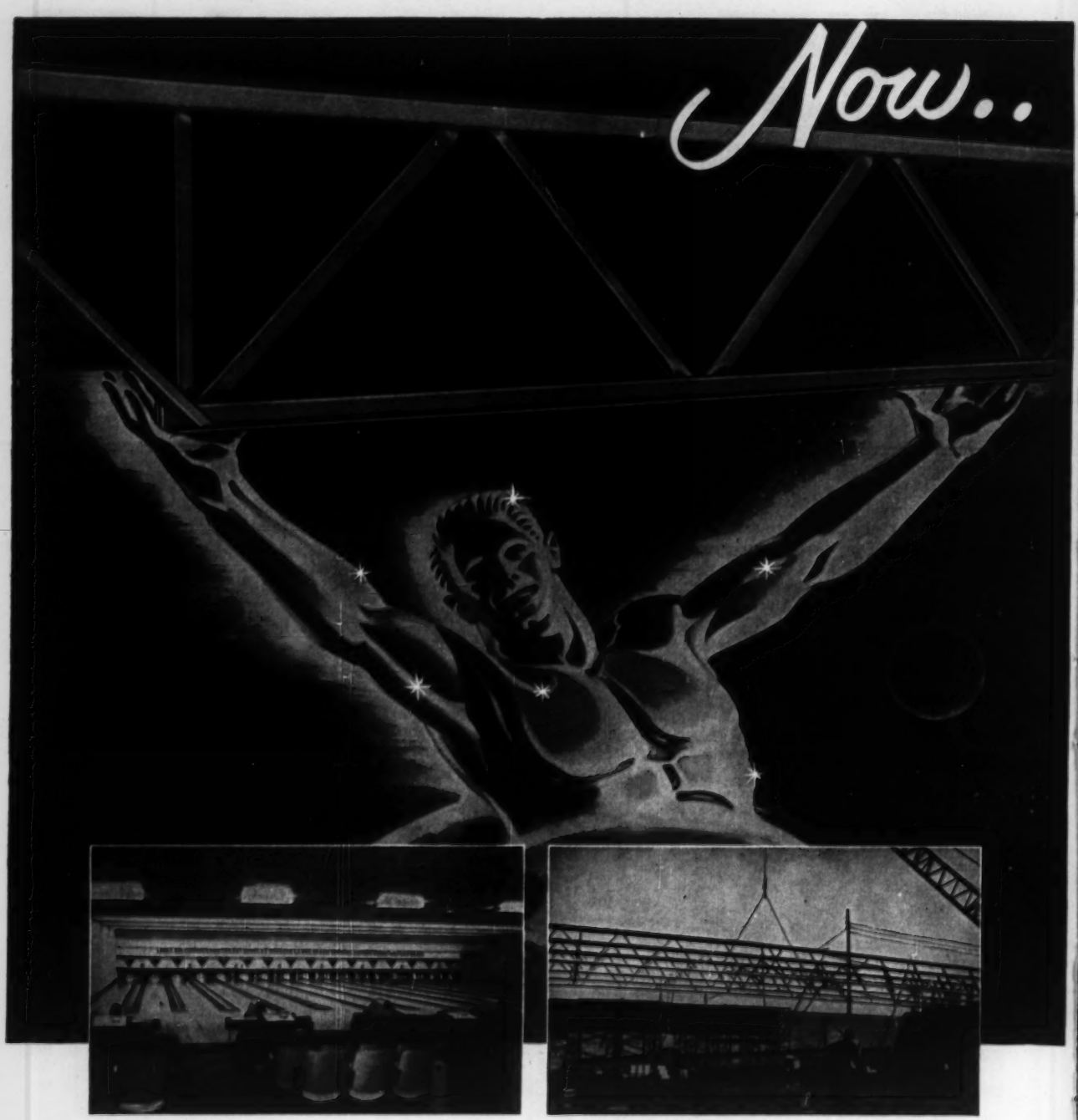


16 alleys wide—and not a single supporting column. Truscon's new Clerespan Steel Joists give Miracle Lanes Bowling Alley, Toledo, Ohio, clear, profitable space wall to wall.

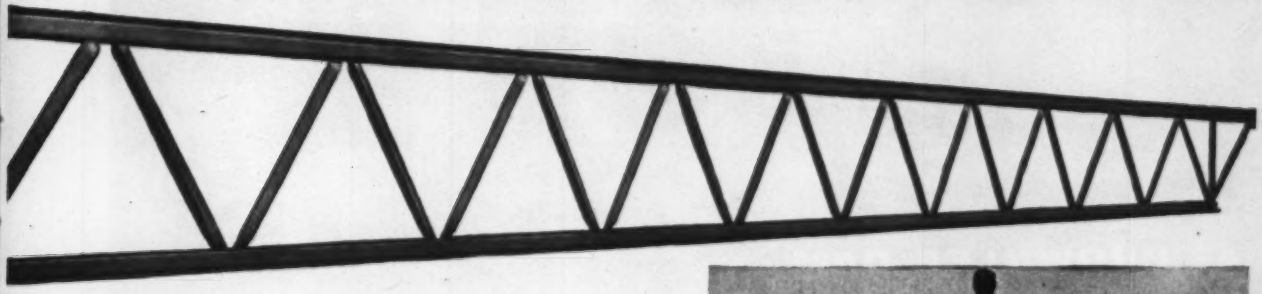
Truscon Clerespan Joist design utilizes a Warren-type truss. Relatively shallow depth allows pleasing exterior design and saves in masonry work by reducing the required height of building walls. Clerespan's light weight allows more savings in lighter framework and footings.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

...A 96-FOOT CLEAR SPAN!



TRUSCON
CLERESPAN® STEEL JOIST

LONGSPAN SERIES

Now made up to 96 feet long. Load-bearing capacity is predictable and dependable. Send coupon for Clerespan dimensions and loading tables.

Truscon Ferrobord® Steeldeck, welded or clipped to the top of Clerespan Joists, produces an ideal, fire-resistant roof. Ferrobord is light, easy to handle, easy to place. Long lengths span three or more purlins. It roofs large areas quickly—flat or pitched. Full-length interlocking increases strength. When laid, Ferrobord provides the perfect surface for application of insulation and built-up waterproofing. Send coupon for specifications and tables.

Provide added fire-resistance with Truscon Interior Steel Doors. And, save dollars in the process. Truscon Steel Swing or Slide Doors and Frames are easy and fast to install. There's no need for on-the-job cutting or fitting. No sanding or sealing required. Doors are prime finished at the factory, ready for one-coat finish painting. A wide variety of types and sizes—including various panel and louver choices—is available in Truscon warehouse stocks. Send coupon for details.

Suspend a fire-resistant ceiling from Clerespan Joists by using Truscon Metal Lath, channels and plaster. When plastered, it forms a lightweight fire-resistive "membrane", wall to wall, protecting structural members from any fire below them. Truscon offers more than 40 different Metal Lath items and accessories that are accepted by all building codes. Your plastering contractor knows them.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3390
3114 East 45th Street, Cleveland 27, Ohio

Please forward facts on items checked:

- ☐ Truscon Clerespan Steel Joists
- ☐ Truscon Ferrobord Steeldeck
- ☐ Truscon Metal Lath
- ☐ Truscon Interior Steel Doors

Name_____ Title_____

Company_____

Firm_____

Address_____

City_____ Zone____ State_____

A VARIED SCHEDULE . . . A VERSATILE DRILL
THE *Joy* JUNIOR CHALLENGER

Monday	**10:30 a.m.**	Drilled 4 vertical holes—26′ deep finished by 12:15 p.m.
	1:00 p.m.	Moved to lower level . . . drilled one hole 22′ deep, 3″ diameter.
	2:00 p.m.	Moved drill to high ground to drill horizontal holes.
	4:00 p.m.	Drilled 2 horizontal holes in shattered rock at high location . . . 2′, deep—finished 5:00 p.m. Quit for blasting.
Tuesday	**7:00 a.m.**	Moved to lower level. Began drilling 4″ dia. angled holes beside other drills drilling 2⅞″ dia. holes. Other drills pulled off location for inability to penetrate clay in a water course at 15′. Drilled 11 holes, 24′ deep, in 6½ hours of 9-hour shift.
	Everyday:	The Challenger drills anywhere, in any position, in any formation . . . and stays on the job. This particular machine runs 20 hours a day, 6 days a week and averages 540 feet of 3″ hole per day. Get complete details on the Junior Challenger from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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JOY . . . EQUIPMENT FOR CONSTRUCTION . . . FOR ALL INDUSTRY

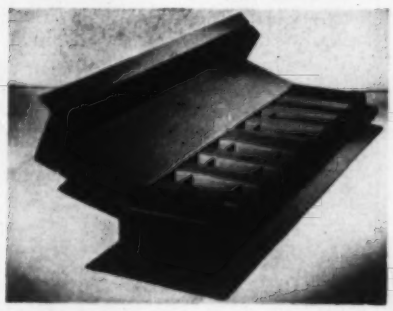
PORTABLE COMPRESSORS

WAGON DRILLS

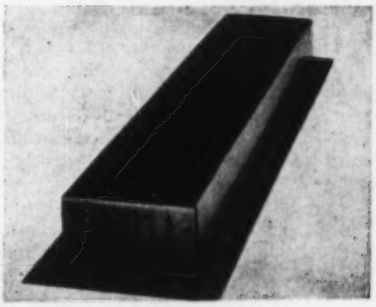
ROCK DRILL BITS

HAND-HELD ROCK DRILLS

WSW C6433-145



FORM OPEN, showing rib stiffened core.



FORM CLOSED, showing flanges.

Paper Form is Water Resistant

Concrete pan forms made of paper have been gaining in popularity despite a common fault of lacking resistance to moisture. Now this disadvantage is claimed to have been overcome in a new design in which asphalt impregnated paper is utilized.

The moisture proofing is applied to a patented corrugated board, called Freezurboard, which is sandwiched between two sheets of smooth paper. According to Justin Hill, president of the company, Freezurboard was originated for use in boxes destined for storage in refrigerators and other moist places, where it has proved its efficiency.

Known as Jayhawk construction pans, the concrete forms developed with Freezurboard by the company's packaging engineer, Robert Budd, also depart from the conventional paper pan in their core design, which utilizes U-shaped rib stiffeners placed transversely of a lengthwise "box beam" instead of the egg crate type core. Greater strength and durability are said to result, so that the cores can be reused many times. The cover for the forms, also of Freezurboard, is of such size that when wrapped over the core, the flanges are half-joist width, making for easy placement without undue measurement. Ends and cover joints can be taped to assure the avoidance of all burrs and drippage.

It is pointed out that the cover and U-shaped beam type core are easily cut or sawed for installation of wiring and utilities, and that laboratory tests and field experience have proved that pans once wet and allowed to dry are actually stronger than before being subjected to moisture.

Jayhawk forms are available in all standard lengths up to 12 ft, and with square or tapered ends for rib construction, while shorter forms are available for waffle type construction. Rib forms are available in widths from 15 to 30 in. and in depths from 6 to 14 in. Waffle form widths are from 20 to 40 in. in depths from 6 to 12 in. Most frequently used on solid decks, the long rib forms are also strong enough to be used on open centering. In either case they may be attached by stapling or by tape. Treated with paraffin and a special additive, the pans do not have to be oiled or treated in any way to assure effective stripping and non-adherence of concrete. CONSTRUCTION DIV., LAWRENCE PAPER CO., LAWRENCE, KAN.

New Power Trowel Blade Permits Early Floating

An adjustable blade for Kelley "Hydra-Trowel" power trowels permits early floating when needed without the use of float plates. When floating, it is claimed the modified blade system will slice high spots and fill hollows to give a level and tight concrete floor. A blade pitch control will change the blade position for floating or finishing.

A low center of gravity, only 6½ in. above the bottom of the blades, is said to give the power trowel stability and eliminates objectionable gyrations.

The power trowel is available, either gasoline or electrically powered, in three 34 in. dia models or in three 44 in. dia models. KELLEY MACHINE DIVISION, WIESNER-RAPP CO., 285 HINMAN AVE., BUFFALO 23, N. Y.

Compaction Costs Cut With New Soil Compactor

A self-propelled, one-man-operated vibratory soil compactor known as CM 20 "Terrapac" has been announced by Vibro-Plus Products, Inc. The manufacturer claims that the new compactor will produce twice the impact of any comparable machine on the market—a 6,600 lb impact 2,000 times per minute. Self-propelled speeds up to 75 ft per minute are possible under normal working conditions.

The machine is said to combine deep compaction with high travel speed to cut compaction costs. Designed for use in all types of fill, it maneuvers close to abutments, retaining walls or piling and is ideal for backfill jobs.

A vibratory element is mounted in the 34 in. by 20 in. base plate with gasoline engine mounted on a platform insulated from vibration by four springs. Power is delivered through a V-belt drive. A centrifugal clutch permits the engine to idle without engaging the vibratory element. The throttle is on the steering handle which is mounted in "live" rubber for easy handling. Operation is simple, so that unskilled labor can be trained in a few minutes.

Total weight is 950 lb and a tow bar with two rubber tired wheels is provided for towing. VIBRO-PLUS PRODUCTS, INC., STANHOPE, N. J.

Adjustable Blades Are Features on I-H Scrapers

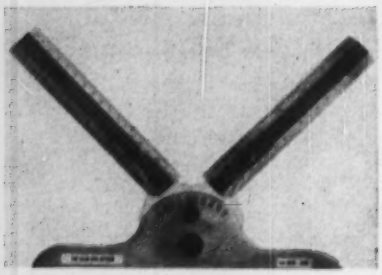
A new, adjustable cutting edge for the bowl is among the many features offered by the two new tractor-drawn scrapers—the 20 cu yd 4S-85 and the 14 cu yd 4S-55.

The 4S-85, with 16 cu yd struck capacity, is matched in weight and capacity for use with a 200 hp crawler tractor. The 4S-55, hauling 10 cu yd struck, is constructed to team up with a machine with the power of the 105 hp TD-18 crawler tractor. Side boards boost the material handling capacity of the units to 22 cu yd heaped and 19 cu yd struck for the 4S-85, and 15 cu yd heaped and 12 cu yd struck for the 4S-55.

The new type cutting edge on the

scraper blades consists of three interchangeable, reversible segments. These permit the operator to shift to one of three cutting depths to match soil conditions and boost loading efficiency.

Roll-out ejection is said to assure swift dumping, clean discharge of wet, gummy material and controlled, even spread. INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO.



Drafting Device Features Various Scale Attachments

A drafting aid known as an adjustable scale-drafter now is available. Made of acrylic plastic, it can be used with a T-square or straight edge. Two beveled flat scales are attached to a swivel quadrant. The 90 deg swivel rotates on a base form with protractor graduated on a shaped oval guide. Clamping screws lock in any desired setting.

Scales for the unit can be ordered in 6 or 12 in. lengths. Architect's engineer's and mechanical draftsman's scales are available. ALVIN & CO., WINDSOR, CONN.

Air Acts as Barrier In Doorless Entrance

Fans and grills at the top and bottom of a building entrance create a band of moving air across the opening to provide a sufficient barrier to eliminate the need of a conventional door. The frictional resistance of the slowly moving air is claimed to prevent draft and heat losses by dampening out air movements in and out of the building.

Fans, filters, heating and cooling unit, and outlet and floor gratings are the components of the system.

The grills extend into the building behind the entrance. The fans, usually placed below floor level, suck in the air through the floor grill, pass it through filters and temperature-adjusting equipment and downward through the outlet grill.

The velocity of the moving air is so low that it will not disturb anyone passing through; yet it provides a balance between inside and outside pressures. SULZER BROS., 50 CHURCH ST., NEW YORK, N. Y.

Dallas Firm Building 10 and 12 Ton Rollers

The Shovel Supply Co. of Dallas is now building two new models of self-propelled rubber-tired rollers. (a nine wheel 10 ton and 11 wheel 12 ton)

These rollers feature removable disc wheels, hydraulic steering and rigid one-piece steel body.

The 11 wheel is equipped with torque converter and straight line reverse without having to throw out clutch. Both models are equipped with water sprinkling tanks and mats if desired. SHOVEL SUPPLY CO., DALLAS 1, TEXAS.

Low-Cost Rake Developed For Highway Contractors

A new rake attachment for Arps utility blades has been announced. Built with closely spaced spring steel tines, the 8 ft rake and frame are available separately, without the blade. It is attached easily by removing two nuts and one pin and sliding the tool into place.

The rake may be angled to the right or left, or in any one of eight positions. In an angled position, the rake will discharge materials in a windrow; in the normal position, it can be used for grading, leveling and mulching soil.

An optional gauge wheel is readily adjusted to maintain consistent depth penetration for land leveling operations and can be detached when not required.

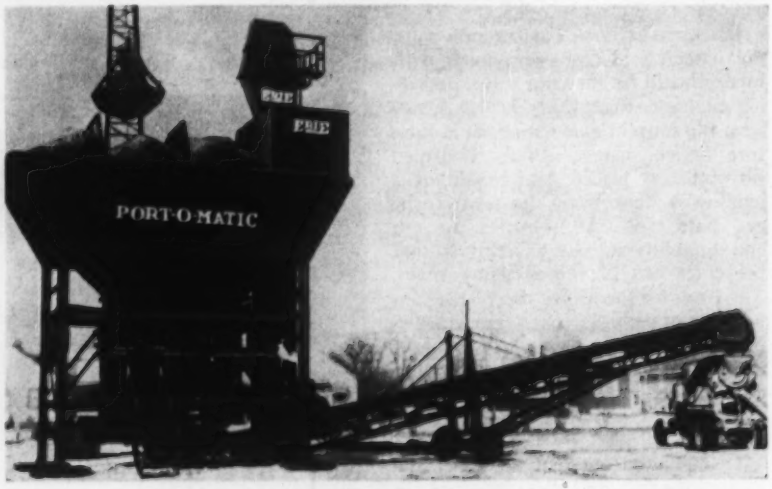
The ultra-fine screen of the rake makes it ideal for spreading topsoil and preparing seedbeds, the manufacturer claims. It spreads soil smoothly, pulverizing, mulching and removing stones and debris at the same time. ARPS CORPORATION, NEW HOLSTEIN, WIS.

Extension Mount Widens Drafting Machine Scope

An extension mounting that can be clamped to the edge of any drafting table has been developed to permit the Walpole-Nordquist drafting machine to work on full-board-size drawings. With the mounting, the drafting machine is raised clear of the drafting table and hangs suspended over the back edge of the board leaving the board free for other work.

The extension mounting is precision made. The end clamps and sleeve support bracket are made of heat-treated aluminum castings. The extension bar is made of chrome-plated steel for permanent alignment and accuracy. WALPOLE EXTENSION MOUNTING, THE WALPOLE CO., 100 BOYLSTON ST., BOSTON 16, MASS.

(*New products continued on page 69*)



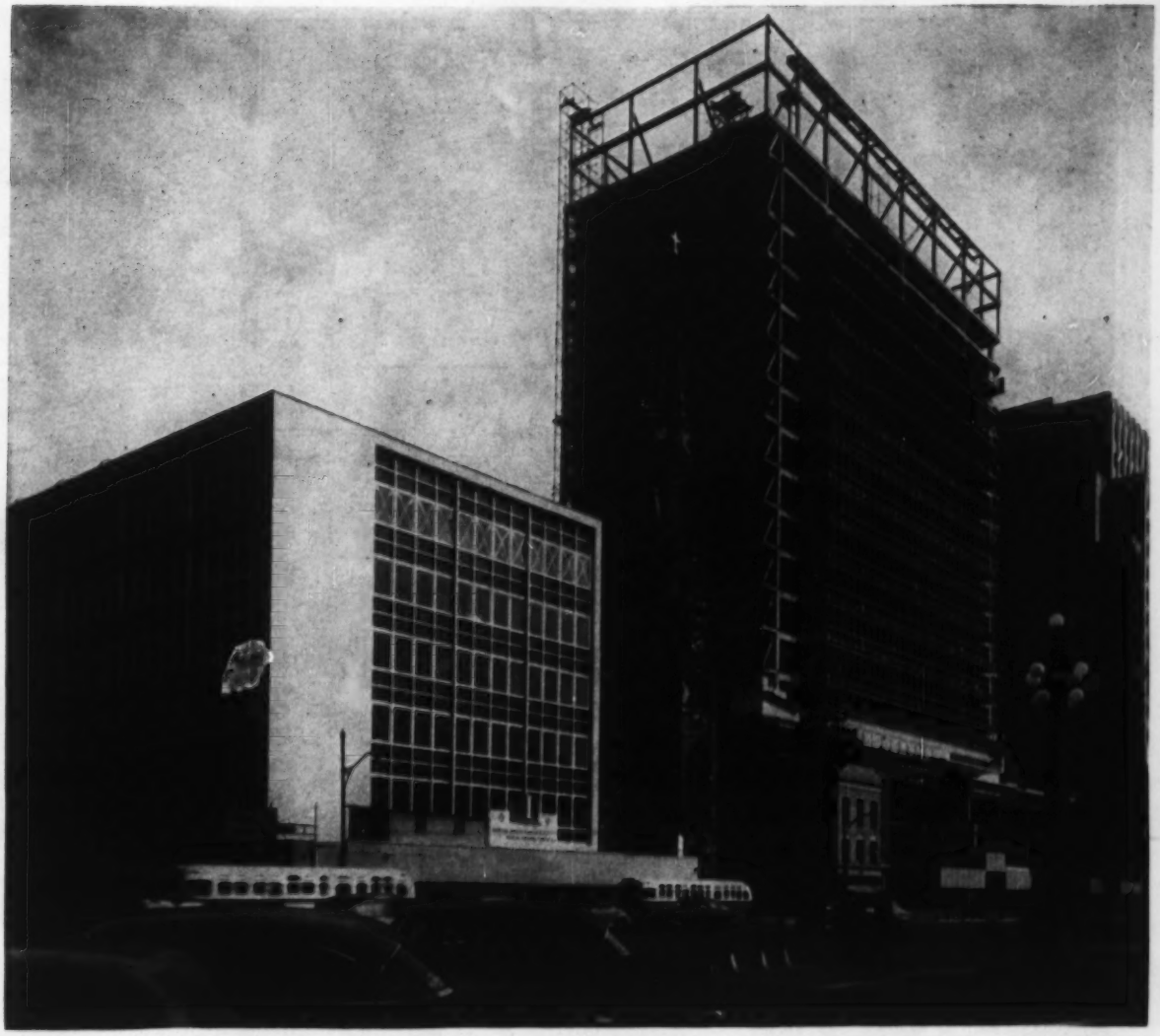
Big Concrete Plant Is Fully Portable

A completely packaged portable truck mixer plant called the Port-O-Matic has been announced by the Erie Strayer Co.

According to Roger Strayer, head of Erie Bin Division, the plant incorporates many desirable features that should have strong appeal to the operator who needs a big capacity portable plant.

The mixer plant is easy to set up and take down. The conveyors are wheel mounted and all bin compartments are 100 yd units. Materials are automatically weighed in a one man operation with a capacity up to 160 cu yd per hour.

No foundations are needed to set up on and it has quick disconnect plug and socket type electric connections. ERIE STRAYER CO., GEIST RD., ERIE, PA.



Big Doings in Newark

Newcomers to the Washington Park area of Newark, N. J., are these buildings of The Mutual Benefit Life Insurance Company. The six-story building, photographed when nearly ready for occupancy, has been leased to the Hospital Service Plan of N. J. The twenty-story structure is to be Mutual Benefit's new home-office building.

Both of these two buildings were fabricated and erected by Bethlehem, using high-strength structural bolts for field connections.

As shown in the accompanying rendering, the front of the office tower is to be of metal-and-glass panel construction. Gleaming white limestone frames the blue-green facade and covers the windowless north and south end walls. The truss-type bracing shown above will support the stone facing.

For the home office building—architect: Eggers & Higgins; structural engineer: Weiskopf & Pickworth; mechanical engineer: Syska & Hennessy; general contractor: George A. Fuller Co.

For the Hospital Service Plan building—architect: Frank Grad & Sons; consulting architect: Eggers & Higgins; structural engineer: Weiskopf & Pickworth; mechanical engineer: Seeyle, Stevenson, Value & Knecht; general contractor: W. L. Blanchard & Co.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

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Better concrete from flow to finish with Dow Calcium Chloride

Anything made with concrete benefits with Dow Calcium Chloride included in the mix, especially in cold weather construction.

It speeds production, assures a stronger, higher quality concrete that requires little pointing up. And it adds very little extra cost to the price of the concrete!

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Descriptive information on how to make concrete better from flow to finish can be yours by writing us direct. Do it today. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. IN 705W.

YOU CAN DEPEND ON DOW

Publications

Membrane waterproofing—An 8 page brochure illustrates Glasfab, a glass-fiber woven membrane waterproofing system. Comparative figures on the characteristics of this and other membrane types are given. Applications and specifications for use of Glasfab with hot and cold processes of waterproofing are detailed. TWINSBURG-MILLER CORP., P.O. Box 207, TWINSBURG, OHIO.

Steel deck roofing—Applications of Truscon's Ferrobord Steeldeck for use as roofing or as forms for concrete slabs are described in a 36 page catalog. Erection procedure, installation details, specifications and live-loading tables are given. Also included are design calculations for seismic and lateral forces and for insulation requirements. TRUSCON STEEL DIVISION, REPUBLIC STEEL, 1315 ALBERT ST., YOUNGSTOWN 1, OHIO.

Installation Fixtures—"Globe" fixtures used in installing plumbing, heating, air conditioning and sprinkler systems are illustrated and full application and size data given in an 8 page catalog on Globe installation products. Products described include steel inserts to hang overhead piping in concrete, split-ring hangers, I-beam clamps and adjustable swivel hangers. HUPPOWER DIVISION, HUPP CORP., 7450 MELVILLE AVE., DETROIT 17, MICH.

Aluminum window installation—Simplified instructions on various phases of commercial window care and installation—including detailed diagrams for installation in different openings, and directions for handling, glazing, cleaning, loading and storage of aluminum windows—are given in a 12 page booklet, The Proper Handling of Aluminum Windows in Commercial and Monumental Buildings. ALUMINUM WINDOW MANUFACTURERS ASSOCIATION, 75 WEST ST., NEW YORK 6, N. Y.

Sewerage and water equipment—A 32 page booklet, illustrated, deals with water and waste treatment equipment by Infilco. Contains cross-references for detailed bulletins devoted to specific equipment in municipal, industrial, sewage and industrial waste treatment fields. BULLETIN 80, INFILCO INC., TUCSON, ARIZ.

Tube and pipe joints—A 24 page booklet shows in large clear illustrations the properties and operations of the Pedi Tube Notcher, used to notch tube or pipe to make fit-up joints for welding. WALLACE MFG. CO., 1304 DIVERSEY PKWY, CHICAGO, ILL.

men of the highway construction industry know they can depend on . . .

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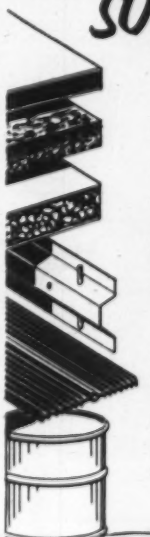

- Expansion Joints; Premoulded Asphalt, Fibre, Corkfill, Sponge Rubber, Plain Cork and Self-Expanding Cork Types.
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Here are 9 top MONEY-MAKERS on today's top building jobs

The country over, these Blue Chip GMC's are outperforming —and out-earning—other trucks in 29,000 GVW-90,000 GCW work

ONE REASON's their power. These GMC's are typical of a complete line offering a choice of the most advanced V8's – the thriftiest Sixes – the truck world's only Turbopower *2-cycle* Diesel.

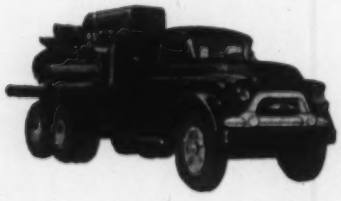
That's harnessed to *extra-stamina-engineered* chassis – in a range of wheelbase lengths for every possible need. Each one's available with *factory-installed*, L-type or full-channel reinforcements—if needed for extra-severe service.

And *all* axles—front and rear—are oversize. There's a selection of rugged transmissions. Safety Power Steering* is available on every model. ***And many of them now offer GMC's new front engine PTO* for transit-mix work.***

Add it all up and it's easy to see what's making these GMC Money-Makers the hands-down choice of more and more truck-users. For the full story on any one of them, see your GMC dealer! **Optional at extra cost*

GMC TRUCK & COACH—*A General Motors Division*

SERIES W500 Tandem Money-Makers —206-h.p. V8 engine. 32,000 lbs. GVW—55,000 lbs. GCW. Axles: 7,000 lbs. front; 28,000 lbs. tandem rear. Three wheelbases 158"-194".



SERIES W550 Tandem Money-Makers —232-h.p. V8 engine. 40,000 lbs. GVW—60,000 lbs. GCW. Axles: 9,000 lbs. front; 34,000 lbs. tandem rear. Four wheelbases 146"-194".

SERIES 630A Money-Makers—220-h.p. Six. 29,000 lbs. GVW—55,000 lbs. GCW. Axles: 9,000 lbs. front; 21,000 lbs. rear. Five wheelbases 141"-201".

SERIES FW550 Tandem Money-Makers — 232-h.p. V8 engine. 89" cab. 42,000 lbs. GVW—60,000 lbs. GCW. Axles: 9,000 lbs. front; 34,000 lbs. tandem rear. Five wheelbases 139"-175".

SERIES W630 Tandem Money-Makers —220-h.p. Six. 42,000 lbs. GVW—65,000 lbs. GCW. Axles: 9,000 lbs. front; 34,000 lbs. tandem rear. Four wheelbases 153"-201".

SERIES 660 Money-Makers – 220-h.p. Six. 30,000 lbs. GVW—65,000 lbs. GCW. Axles: 9,000 lbs. front; 22,000 lbs. rear. Three wheelbases 141"-165".

SERIES W660 Tandem Money-Makers—220-h.p. Six. 46,000 lbs. GVW—70,000 lbs. GCW. Axles: 11,000 lbs. front; 36,000 lbs. tandem rear. Four wheelbases 165"-201".

SERIES W670 Tandem Money-Makers—220-h.p. Six. 59,000 lbs. GVW—90,000 lbs. GCW. Axles: 11,000 lbs. front; 48,000 lbs. tandem rear. Three wheelbases 177"-191".

SERIES D930 Diesel Money-Makers—236-h.p. Turbopower Diesel. 33,000 lbs. GVW—70,000 lbs. GCW. Axles: 11,000 lbs. front; 22,000 lbs. rear. Two wheelbases 152"-164".

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

Can We Afford a $71.8 Billion Budget?

THE BUDGET submitted to Congress by President Eisenhower for the year beginning July 1 proposes federal spending of $71.8 billion. In only four years, three during World War II and one during the Korean War, has the government spent more. Under the proposed budget the government expects to collect $73.6 billion, mostly through individual and corporation income taxes.†

The principal reason for the size of the budget and for this year's increase is an expanding defense program. About 60% of all budget expenditures in the coming fiscal year will be for national security programs. Moreover, this area accounts for about 90% of the proposed increase in federal spending. In addition, as the chart shows, there are large expenditures proposed for purposes other than defense.

Continued budgets of this size, some contend, will lead to inflation and wreck our economy. It has been suggested that they might lead to "a depression that will curl your hair." Yet many insist that the budget, large as it is, still is inadequate in many respects — for defense, schools, agriculture, small business, health, research, indeed, for almost every activity in which the government has become involved.

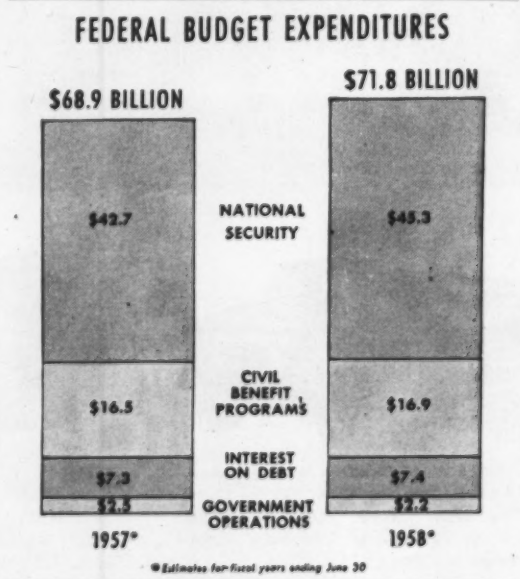
Is It Really Too Big?

Actually, the proposed budget would place no greater burden on the economy than any budget in the last six years, because our economy has been growing. Federal spending per capita under the proposed budget will be about $416, or $10 more than this year; but our per capita income rose almost $80 last year. And, because of our increasing population, next year's expenditures will, in fact, amount to *less* per capita than in 1954 when federal spending was $4 billion lower.

Another way of measuring the burden of government expenditures on the economy is to compare the purchases of goods and services of all branches of government — federal, state and local — with the total output of the nation. The share of our national product taken by government this year will be about the same as in the past two years and, furthermore, about the same as the average for the past 28 years.

By the standard of any recent year, the budget is within the means of the American economy. In this sense, we can "afford" it. But the pros-

†*These figures refer to the regular federal budget and do not include operations of trust funds, primarily for social security programs and the new federal aid program for highways, which are financed by special taxes.*



pect of steadily increasing budgets, requiring 20% or more of our national income, introduces another threat.

The Real Threat

Large and rising budgets that do not balance government spending with higher tax collections clearly would be inflationary and would destroy the value of the savings and income of all who lagged in the race with climbing prices. But serious dangers will still exist even if our budget continues to be balanced, as this year's is.

- **Budgets that require a large take in taxes eat up the savings required to finance private industry.** What the taxpayers must give the government they cannot save. This deprives private industry of the savings and resources needed to expand and modernize producing facilities.
- **High tax rates also undermine the incentive to save and invest in normal business enterprises by taking such a large share of any income gained.** Taxes on corporation income now take 52% of all income over $25,000. And taxes on individual incomes can take as much as 90% of earnings that remain after this 52% bite.
- **High taxes encourage, on the part of both individuals and corporations, the search for "gimmicks" and special treatment.** As a leading character in Cameron Hawley's novel *Executive Suite* observed: "To a far greater degree than most people realize, income tax has become a primary governing factor in corporation management." Indeed, it is only because of the numerous gimmicks and special provisions now available that high tax rates have not already inflicted greater damage to economic incentives.

These dangers comprise the real threat of large and rising federal budgets. It is a threat to continued growth of our economy, and it is no less a threat merely because the budget is technically in balance.

What Should Be Done?

In attempting to hold government spending within reasonable bounds, we should *not* hold back on needed civilian programs. The heavy demands now being urged at all levels of government for roads and schools, for instance, are largely the result of failure to keep pace with the growth of the country. Furthermore, we cannot cut provisions for national security below the minimum level of safety. And unhappily, defense in the rocket and missile age is fantastically and ever increasingly expensive.

What we *can* do is enforce some financial discipline on our military leaders, and hold down our defense expenditures by making sure their demands are justified and by requiring efficiency. In the civilian programs, though some need to be increased to serve a growing economy, we can eliminate the outright waste.

A More Difficult Job

We must also do something far more difficult, and that is to reduce federal programs of aid to special groups at the expense of all the taxpayers. The new budget calls for over $5 billion for veterans, and another $5 billion for farmers. A number of industries and areas stand to receive aid in large amounts based less on necessity than on political pressure. These demands for increased aid, year after year, must be resisted if we are to have any hope of stopping a relentless rise in our budget.

Then, as our national income increases, we can look forward to reducing tax rates and providing greater incentives for the private sector of the economy. **Only in this way — by keeping government spending in line with economic growth — can we prevent our federal budget from being a crippling burden.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT

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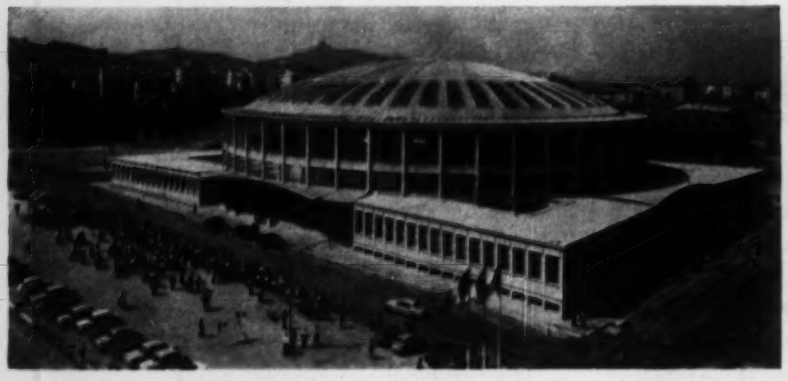
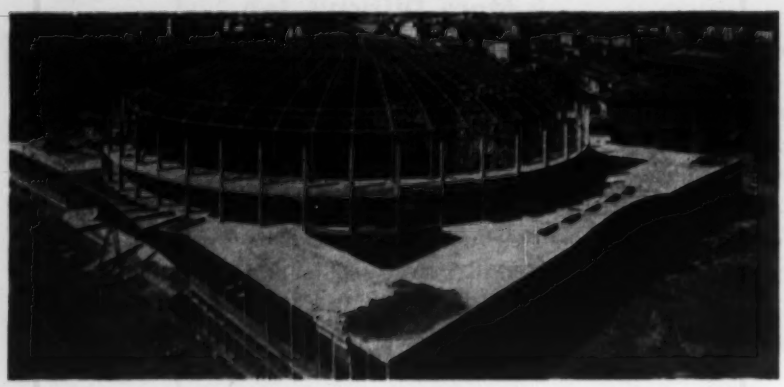
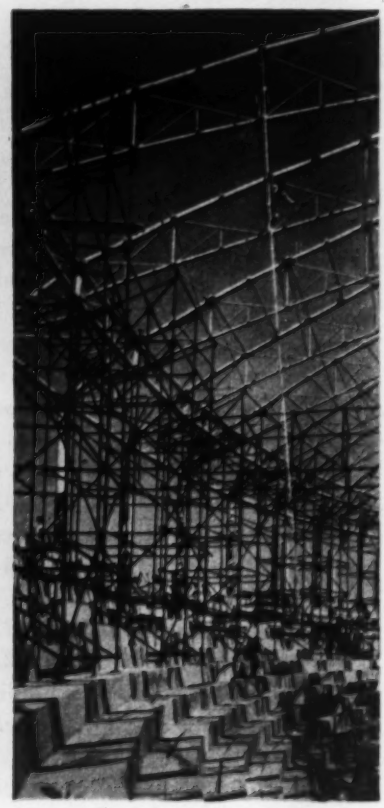


New Olympic stadium in Italy has a dome roof . . .



Framed with trussed arches fabricated from . . .



. . . Tubular steel structurals

Bologna Stadium Framed With Steel Pipes

A new sports arena just completed in Bologna, Italy, contains quantities of structural shapes seldom used in American buildings except as columns. The dome roof of the structure is framed with steel pipe.

The main structural elements of the dome are radial trussed arches, a compression ring at the crown, and a tension ring around the perimeter, all constructed of steep piping.

Designed for sports events, concerts, exhibitions and other crowd-drawing activities, the new stadium is owned by the Italian National Olympic Committee. It has a permanent seating capacity of 5,000 persons. It can seat another 2,000 for certain events (boxing matches, for example) and can accommodate 1,500 standees.

• **Elliptical plan**—Besides the tubular structurals, the dome has another unusual aspect—an elliptical plan. It has a major axis of 226 ft and a minor axis of 204 ft. The outline is not a true ellipse but follows, rather, the approximate elliptical construction frequently used in isometric sketching—an oval described by four circular arcs each with a different center.

The dome frame contains 48 of the radial trussed arches, each supported at its outer end by a steel-pipe column. Starting with zero depth at the columns (that is, with top and bottom chords intersecting), the arches increase to 10 ft in depth at the center of the building. Both chords ascend along parabolic curves, the lower chord attaining a maximum height of 23 ft above its bearing level, the upper chord an additional 10 ft.

• **Tension ring is truss**—Instead of the ring girder frequently used to contain the outward thrust of domes, the tension ring that encircles the Bologna stadium dome is actually a space truss, with a triangular cross section incorporating the tips of the trussed arches. Three steel-pipe sections are its chords, one connecting the column-supported ends of the trussed arches, the other two located on the trussed-arch chords about 8 ft in from the columns.

Before reaching the compression ring at the crown of the dome, the 48 arches combine in pairs so that only 24 frame into the ring. This avoids the congestion of members that would result if all 48 were brought individually to the crown. Where they combine, the arches are braced laterally, but radial motion is not restrained. Thus, no part of the arch thrust is applied to the bracing members. Thrust continues instead to the tension ring at the perimeter of the dome. Other bracing includes diagonal struts between adjacent arches.

Purlins also span between the arches

*90,000 square feet of "natural" fire insurance covers these Beverly, Ohio, schools**

INCOMBUSTIBLE — Gypsum is the *natural* firefighter ... because it's the rock with a "locked-in", fire-fighting water supply. Gold Bond FIREFIGHTER Roof Deck, poured over Gypsum Formboard such as used on this school job, is usually rated as incombustible *because gypsum won't burn.*

FAST INSTALLATION — Up to 30,000 square feet of Gold Bond FIREFIGHTER Roof Deck can be poured in a single day! Under normal conditions, its quick setting action means that 30 minutes after it's poured the roofer can follow with the built-up roofing, using the poured roof deck *safely* for construction traffic.

Note the construction stages in the picture above. At right, the steel sub-purlins are ready for Gypsum Formboard. At center, the FIREFIGHTER Roof Deck has been poured. At left, the felt and asphalt have been applied and gravel is being spread.

LOW COST — The original building cost is lower—because construction is faster *and* because FIREFIGHTER's low dead loads permits lighter structural supports. Maintenance expense is kept low because gypsum is chemically inert and will not rot, burn or decay. Poured gypsum decks are permanent, yet alterations are easy. Gypsum can be cut, nailed or patched economically.

To see how Gold Bond® FIREFIGHTER® Roof Deck will fit into your plans for pitched, barreled or flat roof designs, write National Gypsum Company, Dept. EN-47, Buffalo 2, New York.

***Beverly Elementary and Fort Frye High Schools,** Beverly, Ohio; *Architect:* McLaughlin and Keil, Lima, Ohio; *Contractor:* Knowlton Construction Co., Bellefontaine, Ohio; *Roof Deck Contractor:* Gypsum Constructors of Ohio, Inc., Cincinnati, Ohio.

"FIREFIGHTER" GYPSUM ROOF DECK

NATIONAL GYPSUM COMPANY

Gold Bond
BUILDING PRODUCTS

California contractor estimates:

Time and labor costs cut 75% with the Remington Stud Driver

Out on the California coast, "Research House for '56" is taking shape. It's an experimental house sponsored by Associated Architectural Publications and the latest tools are being used to build it—such as the Remington Stud Driver.

Contractor Bert Pickney says, "The Stud Driver cuts time and labor costs around 75% in anchoring beam supports, partition sills and furring to concrete. It took us only half a day to install the sills—a 2-day job with bolts. No pre-drilling and sills set tight! I certainly recommend the Stud Driver to any contractor!"

YOU CAN SPEED ALL STUD FASTENINGS—light, medium and heavy-duty—with the Remington Stud Driver. It sets *both* ¼" and ⅜" diameter studs in steel or concrete—up to 6 studs a minute either size. The tool is cartridge-powered, portable, ready to work *anywhere*. Forty styles and lengths of Remington Studs to choose from. Get full details by mailing coupon.

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at both top and bottom-chord levels. At the upper level they carry a wood-plank deck, roofed with tarred felt and aluminum sheet. The lower purlins support a perforated gypsum-board ceiling, backed with glass fiber and aluminum foil. The space between the roof and ceiling serves as an air plenum.

• **Design loads**—The designers of the structure investigated three loading conditions: (1) dead load + 51 psf live load acting vertically over the entire building; (2) same as (1) except live load eliminated from one-half the building; (3) dead load + 10 psf snow load on entire roof + 30 psf horizontal wind pressure on one side + 12 psf suction on the other. Each of the three load arrangements was considered in combination with various temperature conditions.

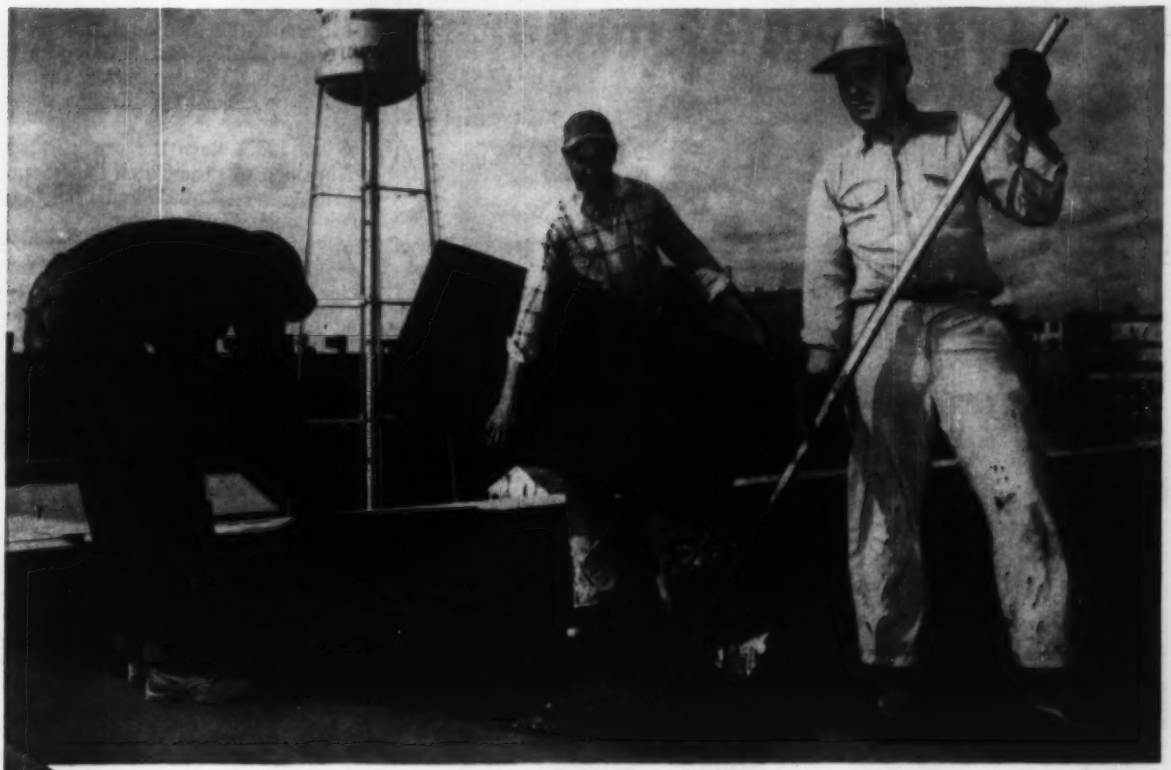
The project was designed by Francesco Allegra, Roman engineer, in cooperation with engineers of the Olympic committee. The Dalmine Co., of Milan, manufactured the pipes and constructed the dome. The general contractor was Enzo Mantovani, of Bologna.

India Port Construction Enters Into Final Phase

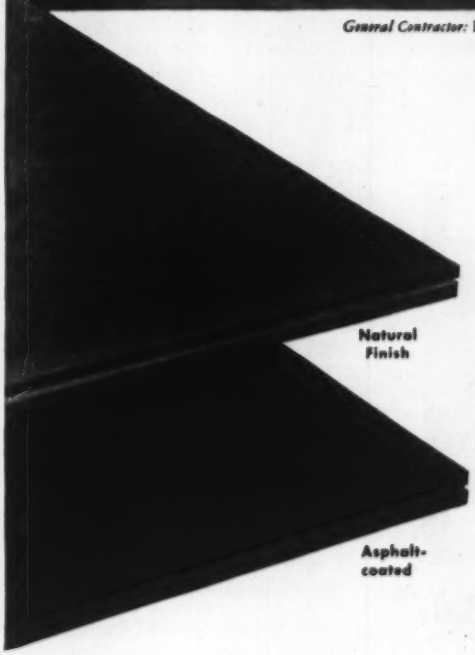
Kandla, near the northermost tip of Bombay state's coastline, is a first five-year plan project costing $35 million. It will give India this year a new port capable of handling 1.2 million tons of cargo a year. Kandla will serve a hinterland of 175,000 square miles with a population of 45 million—including the people of New Delhi.

Construction work on the port and township started in 1949 in an area that was practically cut off from the rest of the country. Despite its good natural setting, Kandla is located on a creek and engineers have had to remove

Scott Paper gets roof insulation value that stays!



General Contractor: R. P. Farnsworth & Co., New Orleans, La.; *Roofing Contractor:* Interstate Roofing Co., Anniston, Ala.



Your roof specifications are safe with Gold Bond Insulation Roof Board

The plans for Scott Paper Company's new mill for their Hollingsworth & Whitney Division in Mobile called for 200,000 square feet of roof board. Here's why Gold Bond Insulation Roof Board was used:

1. **Roof insulation value gets maximum protection** because Gold Bond Insulation Roof Board resists compression from workmen's feet and wheelbarrows during construction...and cuts "soak-in" of hot pitch or asphalt to a minimum.

2. **Roofs cost less to build** because Gold Bond's smooth surface lets workmen mop faster and more easily—and get maximum coverage. Gold Bond's unique "Fiberlok" fabricating process makes this insulation roof board strong, rigid, easy to handle and long-lasting.

3. **Gold Bond Insulation Roof Board is moisture-resistant** because the fibers are treated with water-resistant rosin or asphalt. Available with full asphalt coating for still more moisture-protection if needed. You can specify square, shiplap or offset edges...thicknesses to meet any specified *"C"* value.

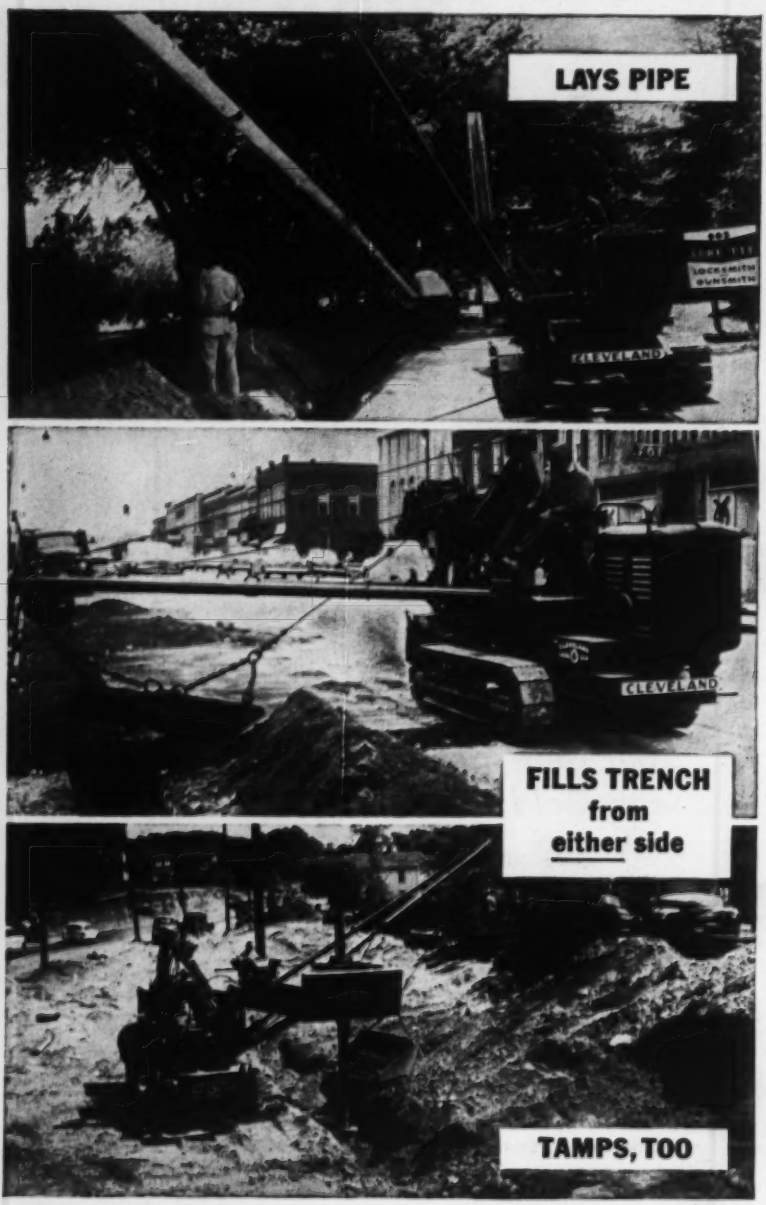
For further information, call your Gold Bond® representative or write National Gypsum Company, Dept. EN-47, Buffalo 2, New York.

INSULATION ROOF BOARD

NATIONAL GYPSUM COMPANY

Gold Bond
BUILDING PRODUCTS

The Cleveland 80W ...a real money maker



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THE CLEVELAND TRENCHER CO.

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Good Everywhere

. . . International

a bar across the mouth of this creek, which restricted navigation only to high tide periods. The navigation channel has been deepened by dredging operations.

Since 1952, when the new port was rail-linked across the Cutch Desert with Delhi and west India, Kandla has been functioning as an oil port.

About 24,000 ft of surface pipelines have been laid to transfer oil from tankers to the storage areas. The lines are supported by rollers fixed on pedestals mounted on concrete pads stationed at 30 ft intervals.

From now to 1961, India proposes to spend about $150 million on the development of her six major ports, including Kandla.

Private Money Is Offered To Build Toronto Subway

An offer was made last week by C. A. Bateman, president of Kale Investments, Ltd., Toronto, to provide $200 million in private funds for construction of Metropolitan Toronto's long planned east-west subway.

In return, the firm wants rent from the Toronto Transit Commission for the new subway for the next 20, 25 or 30 years, at which time the subway would revert in title to the commission.

Construction, operation and policy making would lie solely with the commission, the offer stated.

Underground Conveyor to Serve Vancouver, B. C.

Drilling for a new Vancouver, B. C. post office tunnel that will cost $1,140,000 has started.

The work is being done by Northern Construction Co. & J. W. Stewart, Ltd., a firm that built the Canadian Pacific Railway underground tunnel above which the new but shorter tunnel will be cut.

The new tunnel will connect the C.P.R. station with the new post office and drilling crews will bore out from the station. The C.P.R. tunnel is located at points from 20 to 80 ft underground. The new bore will be eight feet above the older.

When incidentals are added the cost is expected to be over $2 million. The work will involve removal of about 14,000 tons of sandstone. The post office tunnel will be 2,200 ft, while the railway tunnel built in 1931 measures 4,579 ft.

The construction is expected to be completed in September. An automatic conveyor belt system will be installed to carry the mail from trains to the sorting department in the post office.

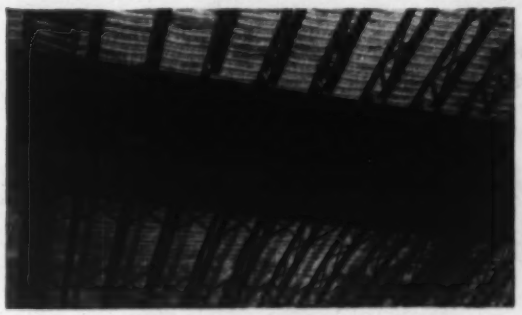
METAL LATH CENTERING . . .

strong reinforcement at low cost !

There's no faster way to prepare floors and roofs for poured concrete slabs over steel joists than with Metal Lath Centering. And it adds strength, too! Gold Bond ⅜" Rib Lath lies across steel or concrete joists and provides *rigid* support for wet concrete; thousands of keys or openings assure dependable *tensile* reinforcement.

Inexpensive Gold Bond ⅜" Rib Lath is quickly and easily placed, and requires no stretching in application. Just lay on supporting members and clip or wire-tie. Costly temporary bracing is unnecessary because there's *no* side pull on the joists. Result: an economical method of centering that provides both rigid form *and* reinforcing for concrete.

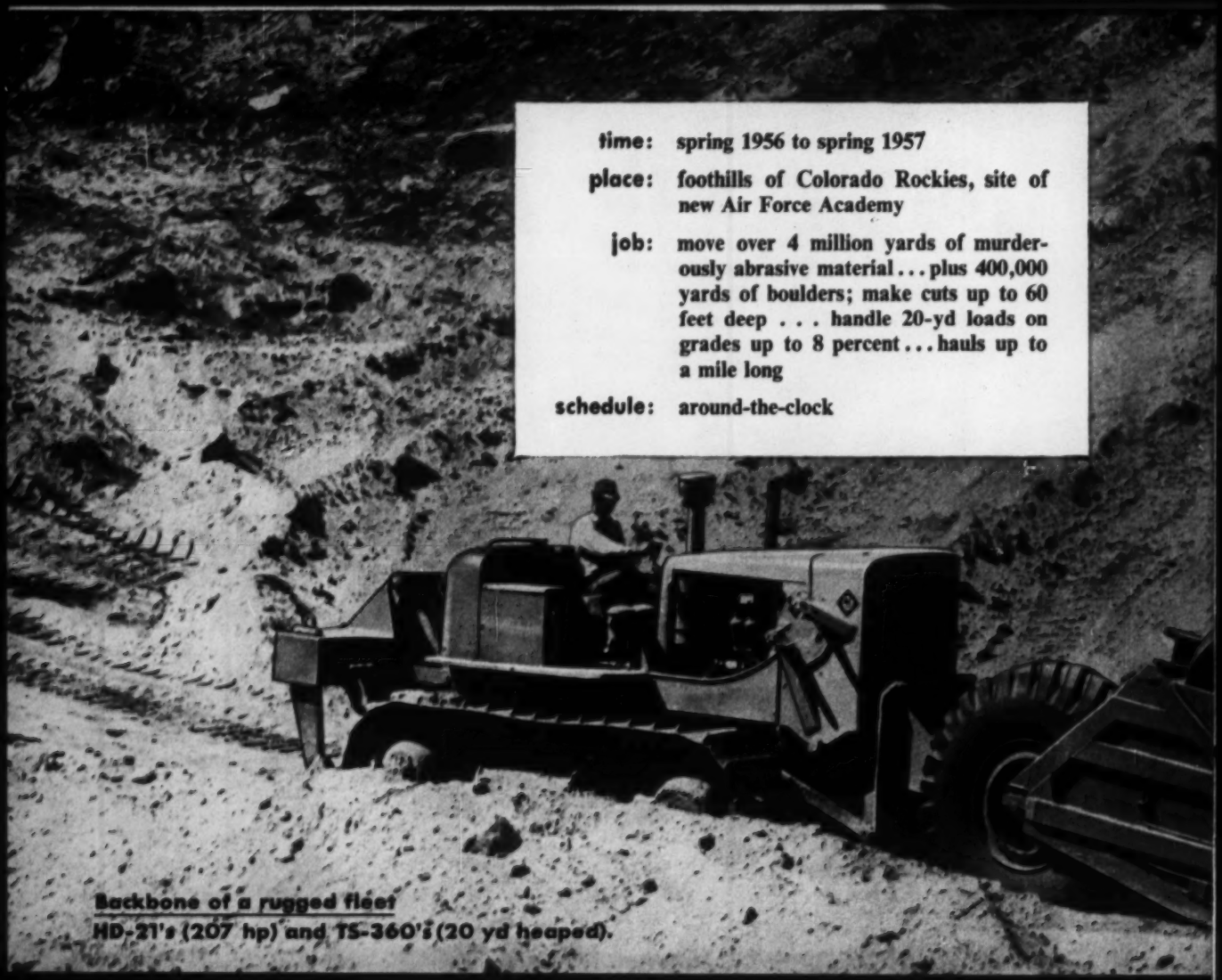
For complete information and engineering data on Gold Bond® Metal Lath Centering, write Dept. EN-47, National Gypsum Co., Buffalo 2, New York.



LATH AND PLASTER

NATIONAL GYPSUM COMPANY

Gold Bond
BUILDING PRODUCTS



time:	spring 1956 to spring 1957
place:	foothills of Colorado Rockies, site of new Air Force Academy
job:	move over 4 million yards of murderously abrasive material... plus 400,000 yards of boulders; make cuts up to 60 feet deep . . . handle 20-yd loads on grades up to 8 percent... hauls up to a mile long
schedule:	around-the-clock

Backbone of a rugged fleet
HD-21's (207 hp) and TS-360's (20 yd heaped).

YEAR'S TOUGHEST MOTOR SCRAPER JOB

Cutting as deep as 60 feet into abrasive dirt and boulder-ridden clay, this fleet of Allis-Chalmers machines accomplished what was one of the toughest jobs handled "on rubber" in the past year.

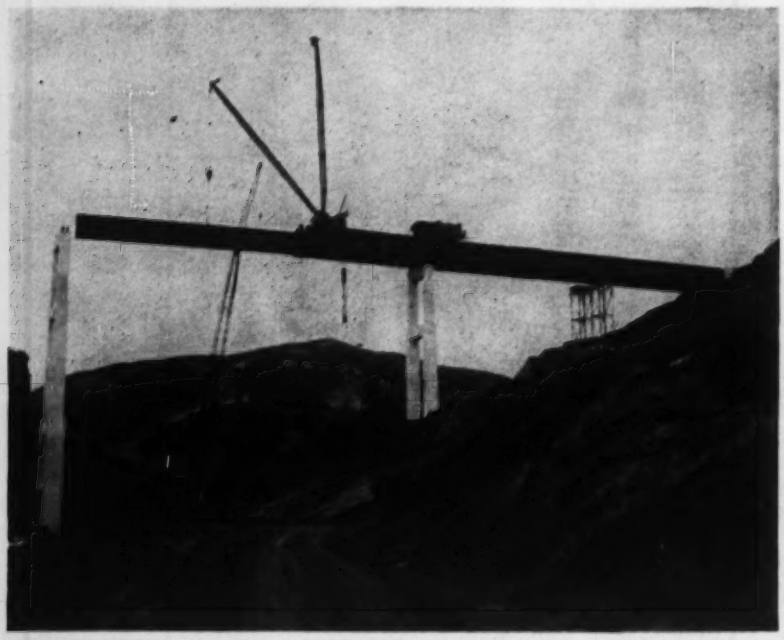
Tough grades, long hauls were part of every cycle on this Colorado Rockies job... but TS-360's consistently moved 20-yd loads fast on haul roads maintained by big Allis-Chalmers Forty Five motor graders.

—NOW COMPLETED...

with Allis-Chalmers construction machinery

A more severe test of modern, high-speed earth-moving methods and equipment than this Air Force Academy job would have been hard to devise. Big performance, rugged dependability . . . easy operation . . . simplified lubrication and service made Allis-Chalmers the choice at the start. Now, in spite of rugged operating conditions, that choice has been justified in a job well done. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*



FLASH FLOODS were a danger to falsework in construction of two highway bridges in California's Napa Hills, so the erector worked from cantilevers.

Bridge Erection Dodges Floods

Spanning a steep mountain gorge is at best hazardous and difficult—but when the inherent problems are augmented by inaccessability and the danger of flash floods, the job really gets tough. In constructing two highway bridges in the Napa Hills of Northern California, Bethlehem Pacific Coast Steel Corporation handled these problems by using interesting fabricating and erecting methods.

The bridges, which are over Pope Creek and Putah Creek, are part of a permimeter road being constructed in Napa County beside Berryessa Reservoir to replace existing roads slated for innundation when nearby Monticello Dam is completed.

Both bridges are 150 ft high at midspan, and have identical spans although the structures themselves are of different lengths. The Pope bridge, at 573 ft, consists of three 166 ft spans with a 75 ft span at the west end, while the Putah bridge at 814 ft has four 166 ft spans and a 75 ft span at each end.

Inaccessability of the site posed the first problem for Bethlehem engineers, since a check of the narrow, twisting roads of the area indicated that nothing over 75 ft in length could be transported to either job.

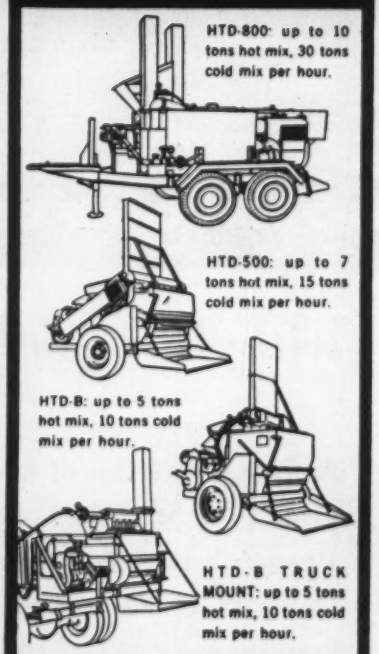
To lick this problem, each of the 166 ft spans was fabricated in three pieces—two 58-ft end sections and a 50 ft center section.

The girder webs are 9 ft 10 in. deep, $\frac{7}{16}$ in. thick and are reinforced on one side at five ft intervals by $\frac{1}{4}$ in. welded stiffeners. End stiffeners are 12 in. wide and $\frac{7}{8}$ in. thick. On the 58 ft sections the 30 in. flanges taper from 2 in. to $1\frac{1}{4}$ in., while those on the 50 ft center sections are a constant $2\frac{1}{4}$ in. The gross weight of three sections assembled was just over 50 tons so sectionalization was necessary during transportation from a weight standpoint as well as that of length.

With the transportation difficulties under control, the engineers still were concerned about the possibility of flash floods—and the subsequent danger to falsework. In construction of the span ends, where the ground was high, there was no danger of flood waters so falsework was safe, and was used. To eliminate the need for temporary supports in the central and therefore lower areas, a cantilever principle was used during steel erection. In all, the cantilever

For Low Cost Paving or Patching

McConnaughay ASPHALT MIXERS


HTD-800: up to 10 tons hot mix, 30 tons cold mix per hour.
HTD-500: up to 7 tons hot mix, 15 tons cold mix per hour.
HTD-B: up to 5 tons hot mix, 10 tons cold mix per hour.
HTD-B TRUCK MOUNT: up to 5 tons hot mix, 10 tons cold mix per hour.

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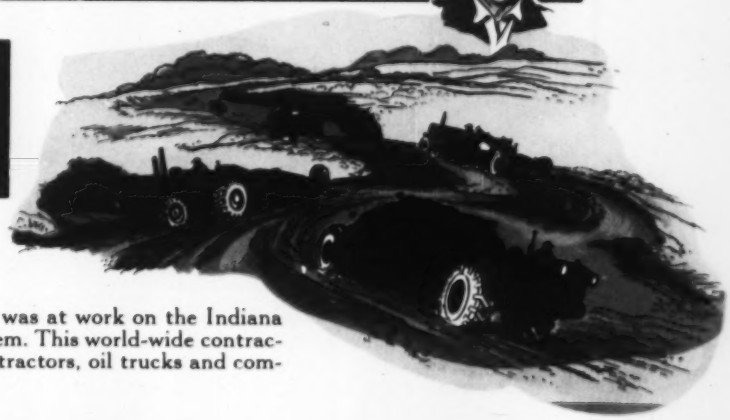
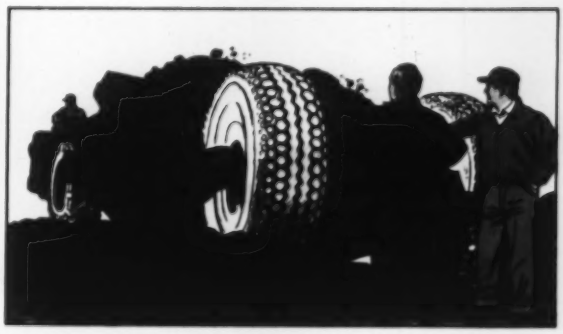
job inspection tour with Bill, your traveling B. F. Goodrich reporter

Building a turnpike

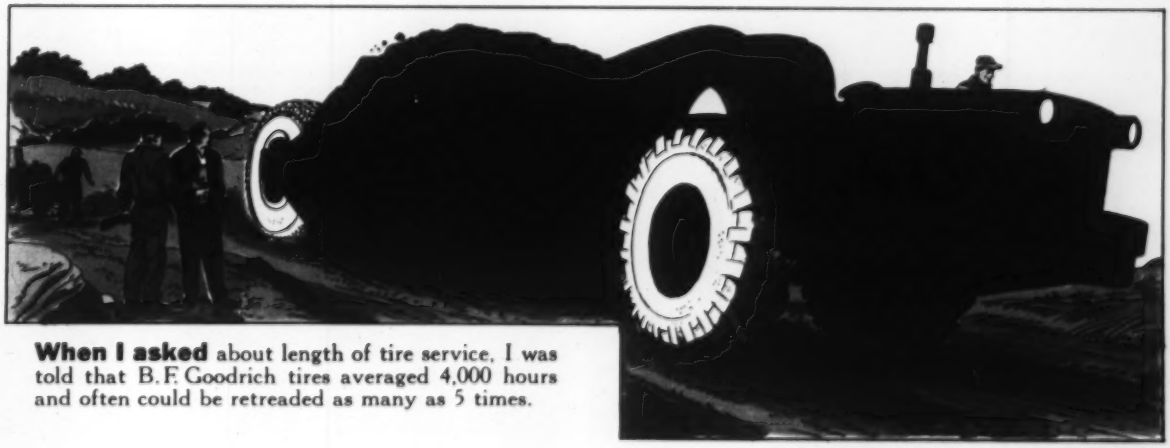


S. J. Groves & Sons Co. equipment was at work on the Indiana Turnpike near Howe the day I visited them. This world-wide contractor was using fleets of graders, scrapers, tractors, oil trucks and compactors 120 hours a week.

I found that sandy soil made the going tough for earth movers carrying 16-yard loads. But the company reported that B.F.Goodrich Super Traction tires were doing an exceptional job. Altogether, they said, they were using 7 different types of B. F. Goodrich tires.



B. F. Goodrich all-nylon tires have done a great job of reducing "down-time" to a minimum, and that means lower operating costs and increased efficiency, they reported.



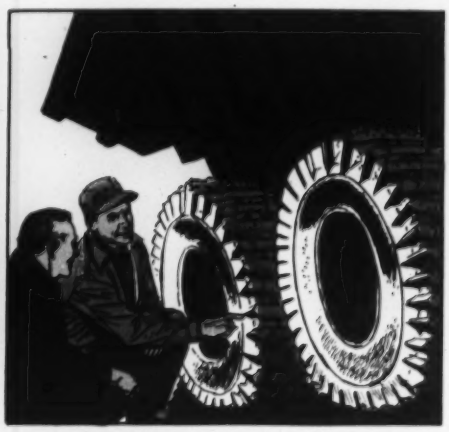
When I asked about length of tire service, I was told that B. F. Goodrich tires averaged 4,000 hours and often could be retreaded as many as 5 times.

more

Hauling sto

Jernigan Trucking Co. operates 17 trucks in and around Augusta, Georgia. In addition to stone, the trucks carry 8 to 20 tons of asphalt, top soil, sand and gravel. Trucks work year 'round, says owner A. C. Jernigan, but busiest times are in the summer when temperatures go well over 100°.

Hauling stone over back-country roads for Little River bridge approaches was a problem for Jernigan. Giant loads of stone and rocky, rutted roads caused even new tires to blow out and fail within 30 days or less. After Jernigan switched to B.F.Goodrich *all-nylon* All-Purpose tires, they had no more blowouts. Competitors who did not switch continue to have trouble.



Many B.F.Goodrich *all-nylon* All-Purpose tires have gone over 50,000 miles —an all-time record on this operation.

"Tire cost is important, but we find the best tire is the cheapest in the long run," Office Manager H. B. Leonard told me. "And we get every dollar's worth out of a B.F.Goodrich *all-nylon* All-Purpose tire."

Earth moving

I found O'Connor Construction Co. tractors and 13-yard scrapers at work clearing a right-of-way in central Illinois. Tires carry a payload of over 22 tons, plus equipment weight.

O'Connor Construction Co. relies on B.F.Goodrich road service to keep its 110 *all-nylon* Super Traction and 40 Universal tires always ready for work. The tread designs are ideal for the job and give good all-around traction.

"Keeping on schedule is important on this earth-moving job," the general superintendent told me. "We're turning this old road into a 4-lane highway."

B.F.Goodrich tires work 3,000 hours on the original tread, the superintendent said, then are retreaded and give an additional 3,000 hours of service.

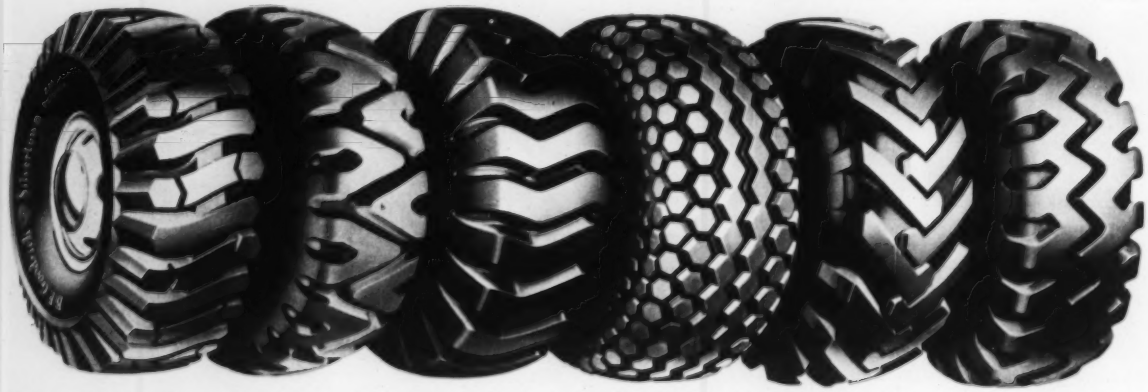
more

Whatever your job... Wherever you work...

B.F.Goodrich

road service is as close as your phone

THERE'S A B. F. GOODRICH TIRE FOR EVERY OFF-THE-ROAD JOB



All-Purpose tires work on paved or dirt roads or in the rough on such jobs as logging, sand and gravel hauling, excavating, etc. *All-nylon* or rayon construction. Sizes 6.00-16 through 12.00-24.

Universal tires are designed for power wheels on trucks and tractors that pull trailer equipment or for free-rolling wheels in severe service. *All-nylon* construction. Sizes 7.00-15 through 24.00-29.

Rock Service tires are designed for mining, quarrying and dirt-moving operations. Newest BFG tire. *All-nylon* cord body in tubeless or conventional construction. Sizes 12.00-24 to 33.5-33.

Earth Mover Traction tires are designed for free-rolling wheels on scrapers, earth-moving wagons and other pulled equipment. *All-nylon* construction. Sizes 14.00-20 to 24.00-29.

Super Traction tires work on drive or free-rolling wheels of dirt-moving rigs. *All-nylon* construction, sizes 18.00-25 to 24.00-29. **Tractor Grader** type, sizes 9.00-24 to 18.00-26.

Rock Logger tires are built for drive and front wheels on dump and logging trucks, cement mix trucks, quarry and construction machinery. *All-nylon* construction. Sizes 8.25-20 to 14.00-24.

Any one of the following B.F.Goodrich zone offices will arrange service • *Phone the one nearest you*

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Chicago, Ill.	ES 8-8800	Houston, Texas	CA 7-5228	Needham, Mass.	NE 3-5815	St. Louis, Mo.	PR 3-2600
Cincinnati, Ohio	BR 1-7800	Jacksonville, Fla.	EL 6-4167	New Orleans, La.	CA 6341	Salt Lake City, Utah	DA 2-2405
Cleveland, Ohio	PR 1-0827	Kansas City, Kan.	MA 1-4400	New York, N. Y.	OR 9-0330	San Francisco, Calif.	AT 2-9620
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Free! Directory of B.F.Goodrich Truck Tire Distributors — nation-wide listing of the names, addresses and phone numbers of BFG distributors who offer road service — and B.F.Goodrich Truck Operators Handbook — facts and figures on BFG tires, load and inflation tables, maintenance tips, etc. Send for your FREE copies today!

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Specify B.F.Goodrich tires when ordering new equipment

B.F.Goodrich
FIRST IN RUBBER

Your B. F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

principle was used five times on the two bridges.

• **How they did it**—On the Pope Creek Bridge, a traveler derrick, working from the abutment, set the first two sections of the first span.

The approach end of the girder was connected to the abutment while the outer end was supported by a falsework tower. The traveler then moved out on the girders to a point over the falsework.

The third section of the girder fed to the derrick by a 50 ton crane which had moved onto the abutment.

With the end span now complete from the abutment to the first pier, the traveler moved out to start the cantilevering.

The initial 58 ft girder section was picked up by the derrick and connected over the pier to the first span, by a splice consisting of a welded compression flange and a bolted tension flange and web using 1¼ in. by 7¼ in. high tensile bolts.

Completion of the splice reduced the unbridged distance between piers 1 & 2 by 58 ft. To close the remaining 108 ft, the traveler moved out to the end of the cantilever while the remaining two sections of the span were assembled on the ground 150 ft below. The two 108 ft, 34 ton spliced sections were then raised and placed by the derrick, and bolted to the cantilevered beams.

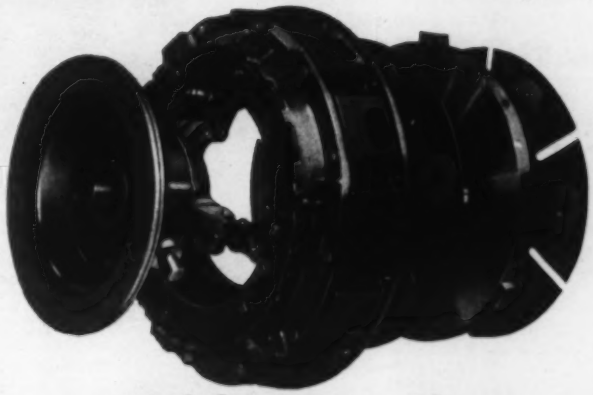
At this point the spans, extending from pier 2, over pier 1 and back to the abutment, were actually continuous. To convert the long span into two short simple spans it was necessary to relieve the stress at the pier 1 temporary splice. By means of two fifty ton jacks set under the girders at pier 2, the girder ends were raised 16 in.

This permitted bolt removal from the pier 1 splice. An extra four in. in length fabricated in the cantilever beam for splicing was cut off with a toch, and all girders were then seated on the shoes of the piers and the abutment. As opposite girders were seated, they were connected by means of shop fabricated lateral trusses which were attached to opposing stiffeners by means of high tensile bolts.

On the Putah Creek Bridge, the same methods were used except that the terrain permitted use of the crawler crane for all steel erection up to the second pier. On neither job was there any field riveting since all splicing was accomplished by means of welding to high tensile bolts. Both bridges were designed by the Bridge Department of the California State Division of Highways.

ROCKFORD

Double Plate Clutch Provides More Torque



- With Less Size

Used in a large crawler-type tractor, this Double-Plate ROCKFORD Morlife CLUTCH (Utilizing two MORLIFE® plates—equipped with button type facings) provides 100% more torque capacity than previous clutches of same diameter. 400% more service life and 50% more heat resistance are other features of this Heavy-Duty ROCKFORD Morlife CLUTCH. A brake plate is mounted on the heavy-duty, ball bearing type release sleeve.

If you have a heavy-duty vehicle in the planning stage, it will pay you to learn about these and other advantages of this new clutch—before you design the drive line. A design study of your present drive lines might indicate advantages of using this ROCKFORD CLUTCH. For information write Dept. D — or

BW SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

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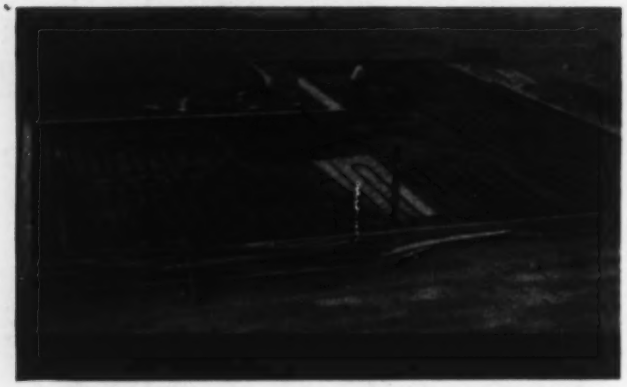
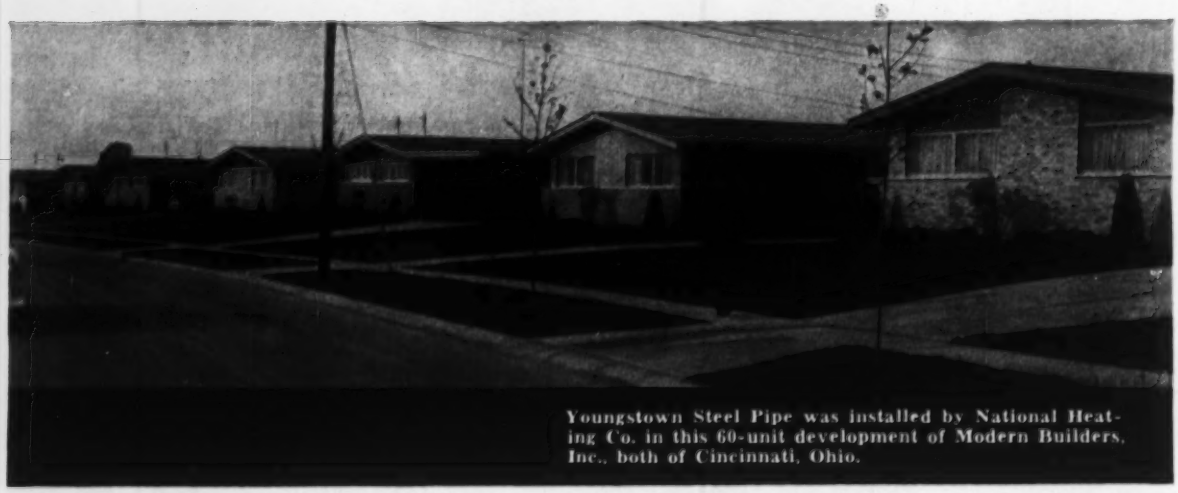


Youngstown steel pipe

. . . Gives Long, Maintenance-Free Life to Radiant Heating Installations



Youngstown Steel Pipe was installed by National Heating Co. in this 60-unit development of Modern Builders, Inc., both of Cincinnati, Ohio.

Specify Youngstown and secure these 7 Points of uniform goodness

uniform ductility	uniform wall thickness and size
uniform lengths	uniform strength and toughness
uniform threading	
uniform weldability	

uniform roundness and straightness

Modern residential developments—like this 60-unit project off Cincinnati's Winton Road—demand only the most modern heating facilities. So, to afford these new homeowners warm, draft-free rooms of equalized temperatures, invisible radiant heating systems utilizing Youngstown Steel Pipe were installed.

For years Youngstown Steel Pipe has been specified by leading architects as well as progressive plumbing and heating contractors for its dependability and long life. That's because it's made of only the finest steel by steelmen with over half-a-century of steelmaking knowhow. All Youngstown operations from ore mining to finish threading are closely quality-controlled to give you the best piece of pipe obtainable anywhere. Why not make Youngstown your specification for long, trouble-free installations?

For additional information or service, contact your local Youngstown distributor—or phone our nearest District Sales Office, today.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

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Busy Man Is Not Too Busy for Civic Chores

Leif Johan Sverdrup came to the new world nearly 1,000 years after another adventurous Scandinavian—Leif, son of Eric the Red—but he stayed to conquer where the first Leif sailed away without leaving a trace. While Erickson left no monuments to his accomplishment, Sverdrup's bridges, highways and other works will be easy for future historians to find.

In recognition of the mark Sverdrup has made as an engineer, soldier and civil leader, the St. Louis GLOBE-DEMOCRAT gave him its 1956 "Man of the Year" award, an accolade reserved for citizens thought to have contributed much to the community welfare. "Man of the Year" Sverdrup wears several hats:

- He is president of the internationally operating Sverdrup & Parcel, Inc., engineers-architects, which handles more than $150 million worth of engineering work a year.
- He is chairman of the Bi-State Development Agency for Missouri and Illinois, and is in charge of a Chamber of Commerce strategy group trying to unravel St. Louis' traffic snarl.
- He is commanding general of the 102nd Infantry Division (reserve), chairman of the Department of the Army's General Staff Committee on National Guard and Reserve Policy, and a member of the Armed Forces Policy Board.

Civic award stories tend toward dullness, but the GLOBE-DEMOCRAT hit a gold mine when it selected Sverdrup. His is a Norse saga with Horatio Alger overtones, and the strains of the Star-Spangled Banner heard softly in the background. The protagonist of the story looks the part. About a dozen years ago, at the time of the war with Japan, he made a trek through the New Guinea jungle, seeking a place to put an air strip. He looks today as if he could make the same trek tomorrow, before breakfast.

Sverdrup was born in Norway, came to the U. S. when he was 16, worked his way through school and on up the ladder. His rise as an engineer was sharpest during the war effort in the Pacific, where he was Acting Chief Engineer to Gen. Douglas MacArthur and later commanded the Engineer Construction Command in the Southwest Pacific.

But the GLOBE-DEMOCRAT cited Sverdrup as *man* (not engineer) of the year for his civic activities: Continued interest in the Boy Scout movement, for which he has received the coveted Silver Beaver, highest recognition accorded to adult leaders; advice to the municipality on aviation matters; assists to the betterment of international relations. Also, much was made of the rainbow of combat decorations he is entitled to wear on his uniform, an array that includes just about everything short of the Congressional Medal of Honor.

LEIF J. SVERDRUP: "Engineers do not take enough part in life of the community."

• **Busy man**—Although Sverdrup was delighted to receive this recognition for past accomplishments, as anybody would be, it caused him some discomfort, for he is a man with his eyes and thoughts very much on the future, and a good deal on his mind. One major challenge just ahead is a $150 million bridge across Chesapeake Bay for the Virginia Ferry District, now in the study stage. This one would be a 22-miler, from Norfolk to Cape Charles.

Then there is the St. Louis concern's continuing responsibility in connection with the Air Force's $200 million Arnold Engineering Development Center at Tullahoma, Tenn., an extremely complex job that Sverdrup & Parcel took on in 1949. Add to that a multiplicity of bridge, highway and industrial projects in this country and abroad, in varying stages of progression. Just now Sverdrup & Parcel's foreign work totals about $60 million, including bridges and highways in Thailand, industrial projects in Venezuela.

The concern occupies two and a half floors of the Syndicate Trust Building in St. Louis. Leif Sverdrup spends about half his time at his office, the remainder in travel, either on business or on some of his extra-curricular pursuits, such as testifying before Congressional committees or looking in at the Pentagon.

He explained in his interview with ENGINEERING NEWS-RECORD that Sverdrup & Parcel, Inc., is the parent organization of an enterprise that employs about 3,000 persons, a third of them engineers. There are two wholly owned subsidiaries, Sverdrup & Parcel Engineering Co., which handles highway projects, and ARO Inc., which is contractor with the Air Force for manage-

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Underground piping must be protected against destructive forces of corrosive soils and electrolytic conditions. Normally, coal tar coating as called for in AWWA specifications C-203 and C-204 would be hot-applied at a coating mill. However, there are times when the volume of pipe involved or the distance of a coating mill make this impractical from a time and cost standpoint.

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TAPECOAT is easily applied, using a torch to soften or bleed the pitch which gives both bond and protection. Available in widths from 2" to 24", it is spirally wrapped or cigarette wrapped around pipe, pipe joints, couplings, conduit, cable, and insulated piping.

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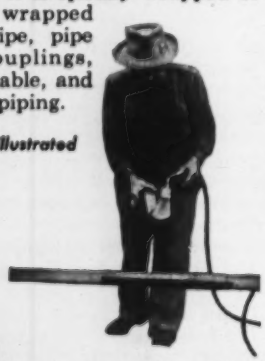

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"ENGINEERS are underpaid and they are doing work below their ability."

ment, operation and maintenance of the Tullahoma development facility. The enterprise has eight specialized technical sections, and its operations are de-centralized through maintenance of offices at Washington and San Francisco.

Sitting on top of such an organization and such a workload, and plunging into civic endeavors as well, Sverdrup obviously has had to learn to accept strenuous activity, mental and physical, as the normal routine. He appears to thrive on this regimen.

The drive to action does not interfere with his enjoyment of life, doubtless because his life is superlatively well organized. He is a devoted family man, an enthusiastic hunter, and as jolly and relaxed a companion at social gatherings as can be found between here and Bangkok.

• **Sees civic duties**—"Engineers do not take enough part in the civic life of the community," Sverdrup said bluntly during the course of ENR's interview. He meant the remark to apply to himself as well as to his fellow engineers, with due reservations that there are notable exceptions.

He expressed the strong conviction that engineers as professional men have certain obligations in the area of public service. They should not feel exploited when asked to serve on committees where their special talents, as engineers, will be called into play. That is where they can best serve, he feels, and they should welcome the chance to take on such assignments.

• **Tackles big jobs**—"That's why I worked on this traffic thing," he said. "That's where I could contribute. It was practically all engineering."

The Chamber of Commerce-sponsored traffic study headed by Sverdrup was the first item cited by the GLOBE-DEMOCRAT in its "Man of the Year" announcement late in December. The newspaper said he had "determinedly and indefatigably" put through the first solid steps in widening the city's traffic bottlenecks. The committee evolved a 17 point proposal calling for a unified attack on congestion. It covered long-range plans as well as practical shortcuts that could be put into effect immediately.

Another Sverdrup-engineered civic endeavor cited was the Bi-State Development Agency's proposal for developing the 4,400 acre Columbia Bottoms site north of St. Louis into an industrial park, complete with river, rail and truck terminal facilities. St. Louis bought the site some years ago, intending to build a secondary municipal airport there. That plan was abandoned and what is now proposed, with Chamber of Commerce support, is that the property be sold to the agency of which Sverdrup is chairman.

Sverdrup minimizes his own participation in these community undertakings, and he certainly is not taking any bows yet for success. Nobody knows better than he that both the traffic relief and industrial site efforts are in the category of unfinished business. He does believe, however, that it is in such broad aspects of planning that the engineer's vision and training are indispensable at top level.

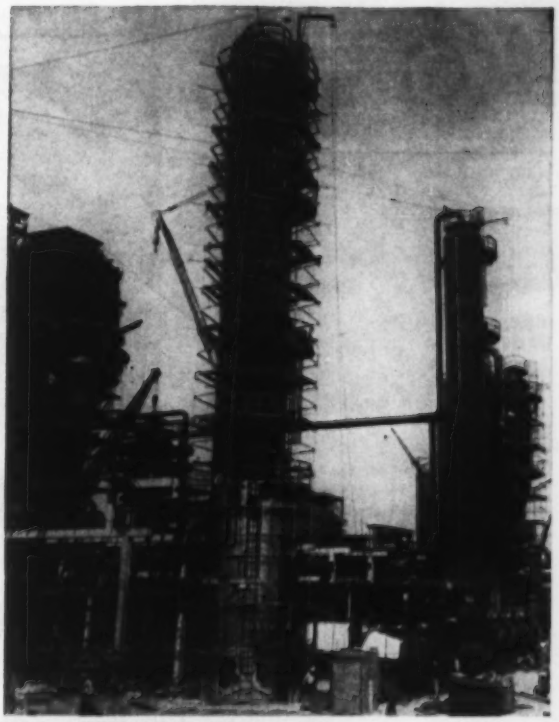
• **Calls engineers underpaid**—Asked whether he cared to make any other general observations about the profession, Sverdrup responded with equal candor. The first point he made was that engineers need to know how to handle the English language to get ahead. The second point was that good graduate engineers with long experience are not paid enough and are used all too often for work that could be done by technicians.

On his first point, he argues that an engineer, no matter how skillful he might be, has to know how to sell his ideas. There is no greater fallacy, in Sverdrup's view, than the one about the world beating a path to the door of the man who can build a better mousetrap. New products, new ways of doing things, have to be sold, and the engineer must be able to talk to a board of directors in clear, non-technical language.

Sverdrup introduced his discussion of

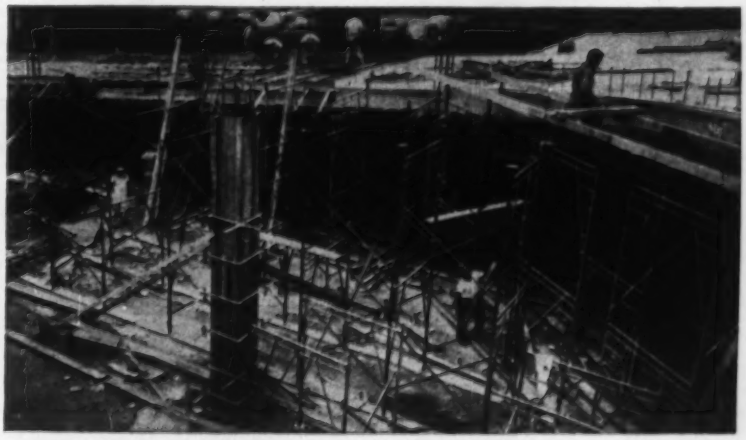
Scaffolding Methods . . .

A Picture Report on Efficient Ways To Scaffold and Shore... by Patent Scaffolding Co.



BIG REFINERY JOB — Nearly 15 miles of "TubeLox"® Steel Scaffolding and 3,500 "Trouble Saver"® Sectional Steel Scaffolding frames are used by C. F. Braun & Co., contractor, to get safe, sturdy working platforms for building the new Tidewater Oil Co. Delaware Flying-A Refinery, Wilmington. Note how "TubeLox" Scaffolding provides easy access all over the 155'-high depropanizer column, center.

CLOSE-UP — "Trouble Saver" Sectional Steel Scaffolding surrounds an oil storage tank at the construction scene of Tidewater Oil Co. Delaware Flying-A Refinery, Wilmington. Workmen get close to apply exterior insulation.



SLOPING FORMWORK SUPPORT — Formwork for the concrete pan joist construction of the sloping vehicle ramp at the Arnold Constable Store, New Brunswick, N.J., is supported by 5'-wide "Trouble Saver" Sectional Steel Shoring frames. 160 2'-wide Ladder Scaffolds are also used to support 18"-deep beams varying from 30" to 54" wide. James Mitchell, Inc., is the general contractor.

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MAC ARTHUR'S engineer-soldier makes a genial host when "old soldiers" meet.

the status of the graduate engineer by observing that in his opinion the tendency for unionization of engineers nowadays was an indication that "someone has failed." The Sverdrup & Parcel concern, which originated in 1928 when Sverdrup joined forces with Prof. John Ira Parcel of the University of Minnesota, is not unionized.

"There are two things basically wrong with the engineering profession," Sverdrup told ENR. "Engineers are underpaid and they are doing work below their ability. There is no use in having graduate engineers out running transits and levels. . . I can teach a high school graduate to run a level in a week's time."

• **Blames management**—Sverdrup made it clear that he felt management had been remiss in not giving junior engineers the kind of work their intensive training qualified them to do, and in not providing adequate rewards and incentives. He suggested that the Armed Forces often do a better job, in the area of supervision, periodic upgrading in pay and promotions, than private industry does. He said these were important morale factors in any organization. Wastage of highly trained personnel could be avoided in the U. S., Sverdrup said, by more wide use of technicians.

Sverdrup's interest in proper utilization of manpower carries over into his assignments as chairman of the General Staff Committee on National Guard and Reserve Policy and as a member of the Reserve Forces Policy Board—not to mention his leadership of the 102nd Division. Last summer he took the division to Camp McCoy, Wis., for the usual two weeks of active duty. Last fall the advisory job took him on a 25,000 mile tour, visiting troops.

• **Was wartime hero**—If there is a part of the Sverdrup saga that stands out, it is his meteoric career as an engineer officer in World War II. He was a first lieutenant of artillery in the first World War.

In the interval between, he rose to be chief bridge engineer of the Missouri Highway Department, established his own business, and built some notable bridges. When the Japanese attacked Pearl Harbor, he was out in the Fiji Islands as a civilian, laying out a series of air bases for ferrying of bombers to the Philippines and Australia.

Sverdrup drove his task through to completion and returned to Washington, early in 1942, long enough to receive a direct commission as a colonel in the Corps of Engineers.

In the battle for New Guinea, Sverdrup was ordered to make a reconnaissance for a road across the island. He and a guide spent six weeks in the jungle. Emerging, he reported the road was not practicable but recommended that a series of air strips be built instead.

The recommendation went all the way up to General MacArthur, who heard Sverdrup out, checked the plan on the map and did what a good commander would be expected to do in such a situation.

"Approved," MacArthur said to the colonel, "and you'll do it."

Sverdrup did it.

Using a force of about 300 New Guinea natives, dubbed the "Papuan Aviation Battalion," he got the strips built. Gifts of tobacco and the twentieth century sorcery of an old phonograph helped get the cooperation of local tribesmen, whose wild dances served to pound down the newly cleared landing fields. Then aircraft brought in machinery and later came the troops.

• **The "old soldier's" engineer-soldier**—MacArthur did not forget the big, capable, grinning reserve colonel who could improvise and get things done. Sverdrup continued to display extraordinary courage and ingenuity as the tide turned against the Japanese. He was wounded in both legs at Finchshafen. He came out of the New Guinea campaign with the Purple Heart, the Silver Star for gallantry and the Distinguished Service Medal.

When MacArthur returned to the Philippines, Sverdrup was in the first wave of assault troops at Lingayen and

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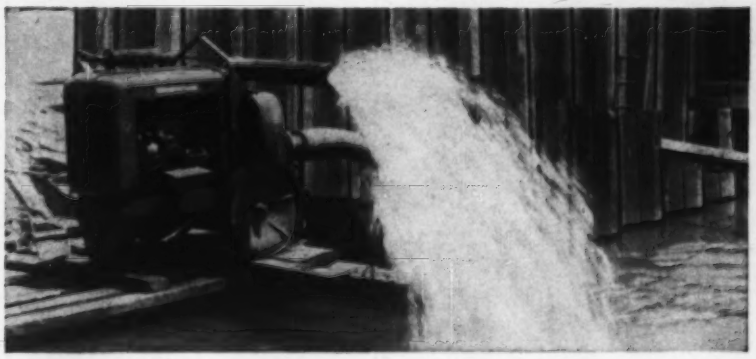

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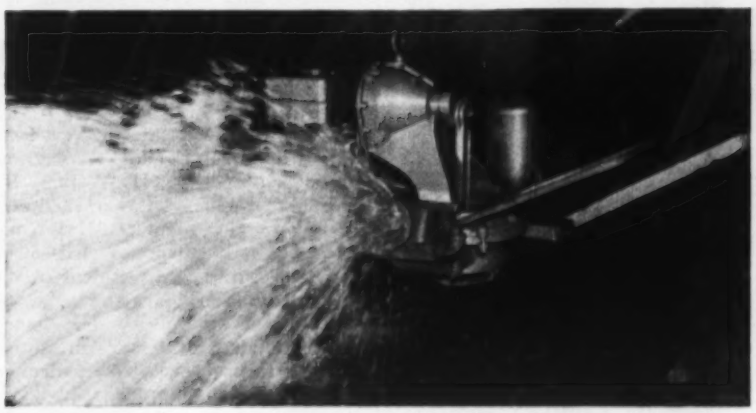

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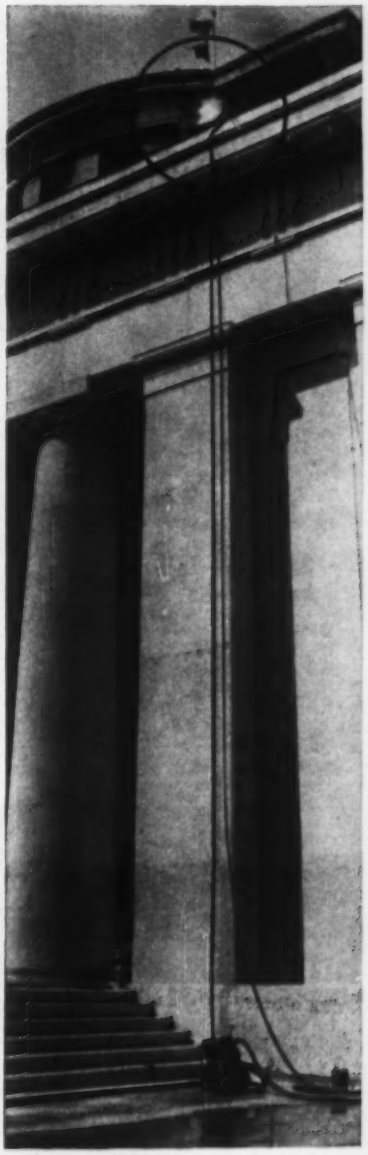

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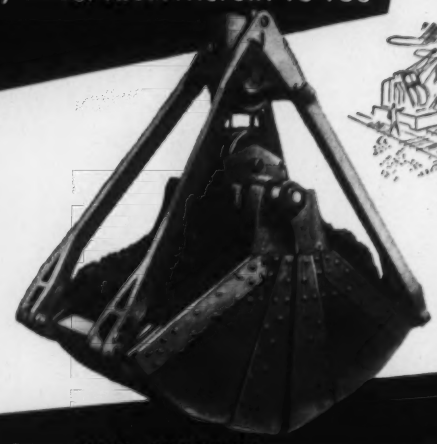

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went in to help seize the air field. For that action he became the first American cited in the Luzon campaign, receiving the Distinguished Service Cross for bravery. MacArthur himself affixed the DSC to Sverdrup's uniform, with the comment: "Here is the engineer-soldier at his best."

Sverdrup was responsible for building 200 airstrips and other installations in the Pacific, collected several foreign decorations, including the Croix de Guerre, and came out a major general.

Every year on General MacArthur's birthday anniversary, Sverdrup is host at a New York dinner honoring the general. It is a chance to meet old comrades-in-arms and talk over old times.

Careers . . .

Business

Arthur K. Hyde has joined the client relations division of Harley, Ellington & Day, Inc., Detroit architects and engineers. He had served in a similar capacity for the past several years as vice president of Giffels & Vallet, Inc., L. Rossetti, Detroit.

John J. Mathison is appointed head of the sanitary engineering division, Green Engineering Co., of Pittsburgh, Baltimore and Boston. Mathison was formerly with Morris-Knowles, Inc.

Robert H. Uhl has been named director of the new Lansing, Mich. office of J. Stephen Watkins, Consulting Engineers, Lexington, Ky.

Robert Burns, Danforth W. Toan and **Frithjof M. Lunde** have become associates of Charles H. Warner, Jr., under the firm name of Warner, Burns, Toan & Lunde, Architects, New York.

Stephen W. Benedict has been elected executive vice president of the Master Builders Co., a division of American Marietta Co. He joined Master Builders in 1948 as director of research and has been vice president of research and engineering since 1955. A graduate of the University of Illinois in civil engineering, he has served as structural research engineer with the National Advisory Committee for Aeronautics, and was materials engineer for 10 years at the National Bureau of Standards in the cement and concreting material section.

R. J. Wolf has been appointed division manager in charge of engineering design, estimating and scheduling for the Kaiser Engineers Division of H. J. Kaiser Co.

Neil O'Leary and **Richard M. Johnsen** have been named vice presidents, and **Edmond P. Rochat** appointed to the board of directors, of the Foundation Co., New York.

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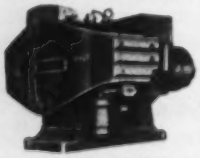

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Obituaries

Hans Kramer, 62, San Francisco consulting engineer since 1946, when he retired as brigadier general after 27 years with the Corps of Engineers, died Dec. 16. As a consulting engineer he had been called in on such projects as the San Francisco Bay salt water barrier, enlargement of the Panama Canal, negotiation of the Colorado-Kansas-Arkansas River Compact Commission, and Oahe Dam. During his Corps career he supervised construction of Conchas Dam in New Mexico and was assistant supervising engineer at the Panama Canal. He studied at the University of Michigan, West Point, University of Pennsylvania, and the Technological University of Dresden in Germany, where he received a doctor's degree in engineering.

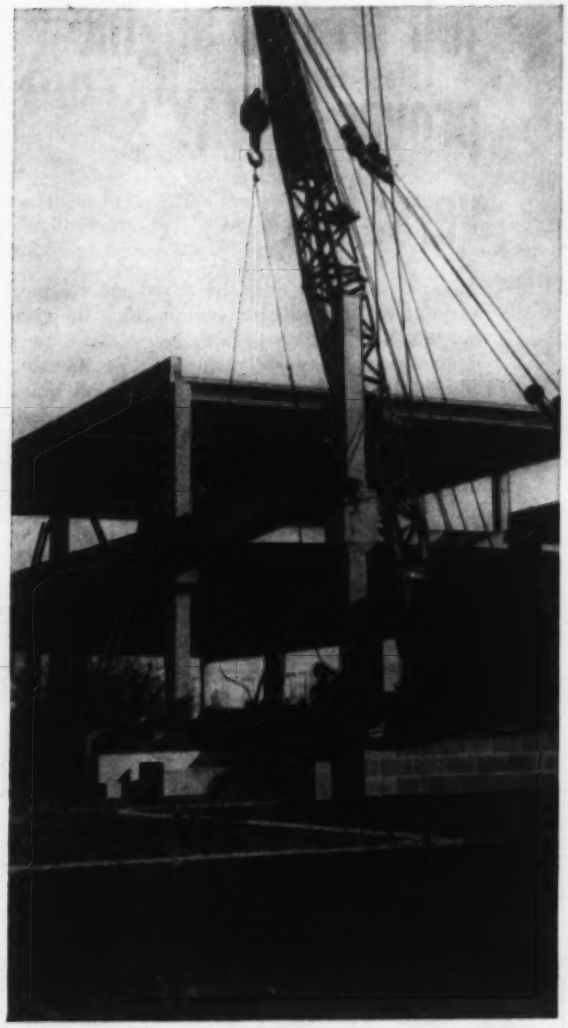
Roy J. Storey, 75, retired civil engineer of Seattle, died Mar. 1 at Renton, Wash., where he maintained engineering and land survey offices. He had worked for 17 years with the Seattle engineering department and from 1922 to 1938 was engineer in charge of bridges and buildings for the Copper River & Northwestern Railroad in Cordova, Alaska.

Arthur Sedgwick, 72, designer of modern bridges used on Ontario highways, died Feb. 26 in Toronto. He resigned in 1954 after 45 years as chief bridge engineer for the Ontario Highways Department. During that time he supervised construction of 1,187 major bridges and interchanges, and 6,921 county road bridges. After retirement he was a bridge engineer consultant to the government.

Joseph Vinch, 64, treasurer of J. Vinch & Sons, Inc., Trenton, N. J., died Feb. 19. His company, which he founded in 1910, specialized in the construction of secondary roads and general contractor work.

Herman H. Smith, 81, retired in 1934 as chief engineer of the New York City Board of Estimate, died Mar. 4, in Winsted, Conn. He was a graduate of Massachusetts Institute of Technology in 1899, and began his career as a construction engineer with the Long Island Railroad. He entered civil service in 1903 as a surveyor in the Bureau of Highways in Brooklyn and later, was appointed Chief Engineer of Highways. He became Acting Chief Engineer of the Board of Estimate in 1921 and Chief Engineer in 1928. Among his special projects was the mapping of Staten Island.

Precast concrete frame erected in 9 working days!



Placing prestressed spandrel beam 28′ x 36″ x 18″ at new Albert Godde Bedin, Inc. plant, Depew, N. Y. Precast columns shown are 24′ x 14″ x 14″.

• The entire frame of this industrial plant in Depew, N. Y.—with a total floor area of 25,617 sq. ft.—was erected in *9 working days.*

Such fast work resulted from the use of prestressed concrete beams, floor and roof channels and precast columns, precision made by Frontier Dolomite Concrete Products Corporation, Lockport, N. Y.

IN THE MANUFACTURE OF THESE PRECAST UNITS, Lehigh Early Strength Cement and steam curing were used to achieve maximum production efficiency and economy. The concrete reached 3500 PSI in 12 hours, permitting removal of units and re-use of forms in *less than half the time required with regular portland cement.*

This is typical of the advantages of Lehigh Early Strength Cement in modern concrete construction.

Owner: Albert Godde Bedin, Inc., New York City
Architect: John R. Weber, New York City
Engineer: Freyssinet Company, Inc. New York City
Contractor: George W. Walker & Sons, Inc. Buffalo, N. Y.

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- **LEHIGH AIR-ENTRAINING CEMENT**

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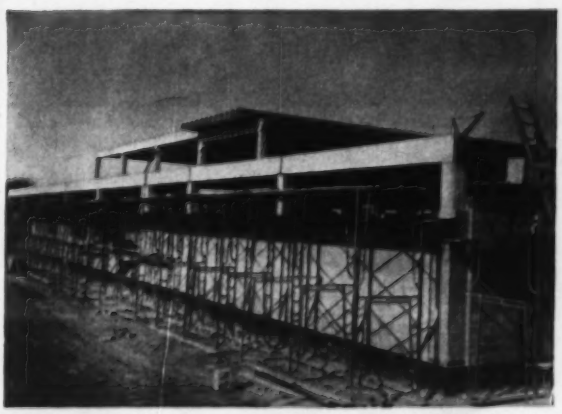
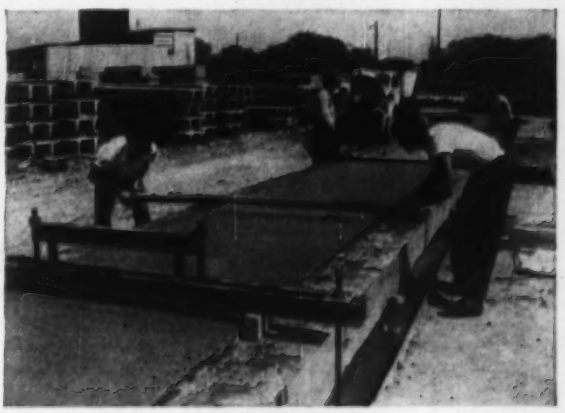


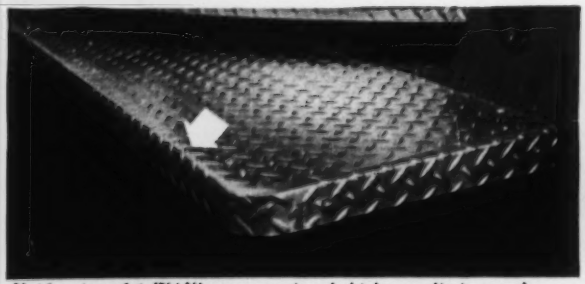
Frontier Dolomite also manufactured the concrete block for the exterior walls. Blocks were made with Lehigh Air-Entraining Cement.



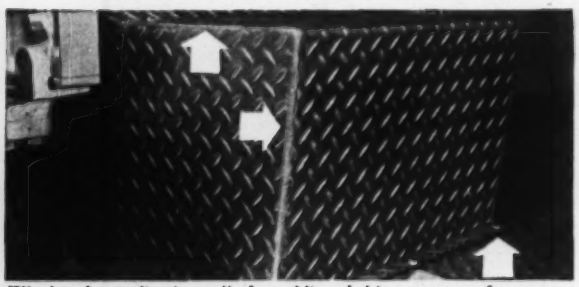
Wood screeding prestressed double tee, 42′ long, 4′ wide, 14″ deep, at Frontier Dolomite plant.

tough fabricating job on fire engine proves 4-WAY'S® versatility

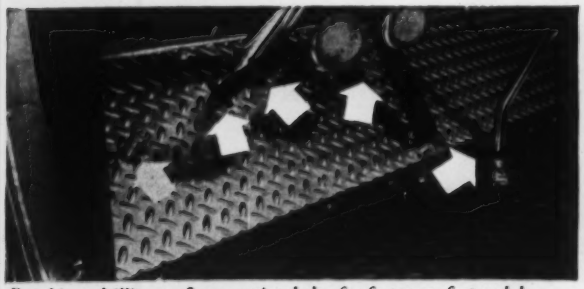
Fabrication to form even the varied and complex shapes used on firefighting equipment is no problem with 4-WAY Safety Plate. No special tooling is necessary. Ordinary cutting, drilling, forming and similar standard shop equipment is all that's needed. Good reason why this leading chassis and body manufacturer has specified Inland 4-WAY for more than 15 years! 4-WAY is used in an uncommonly wide variety of ordinary and extra-ordinary applications. For complete information and specifications, write Dick Prendergast, Room 1262 at the address below.



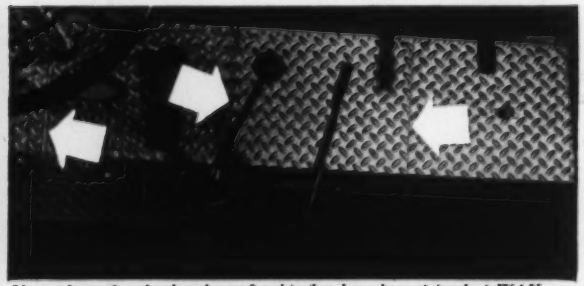
Uniformity of 4-WAY's cross-sectional thickness eliminates the possibility of deflection while bending, even at sharpest angles. Standard equipment can be used.



Whether the application calls for welding, bolting, or screw fastening, all are easily accomplished on 4-WAY with conventional methods.



Punching, drilling or flame cutting holes for fasteners, foot pedals, etc. is no problem with 4-WAY.



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Concealing Unusual Conditions

Contractors frequently incur delays and extra costs by encountering job-site conditions materially different from those they anticipated. The courts have generally held that it is constructive fraud for an owner to conceal the known existence of adverse conditions not disclosed by plans, specifications or invitations to bid, and that, in such instances, the contractor can sue the owner for damages. Many of the cases relate to subsoil conditions but other types of concealment sometimes exist. The following cases illustrate the legal approach to the problem:

• Case No. 1

Before the subways were designed in New York City, the city employed a contractor to make borings to determine the character of the soil that would be encountered in the performance of the work and also to enable it to design the structure properly. The results of these borings were set forth on what was described as "Supplementary Drawings." The invitation to bidders noted that these drawings were available to contractors and "are exhibited to contractors without any guarantee on the part of the Commission as to their completeness or correctness." The invitation to bidders also provided: "Bidders must examine the form of contract, specifications, maps and plans; must visit the location of the work and inform themselves of the present conditions along the line thereof and make their own estimates of difficulties attending the execution of the proposed work."

In two cases, contractors were allowed a recovery for the increased cost of the work that resulted from encountering conditions different from those indicated on the boring drawings, where it was shown that the city's engineers could be charged with knowledge of the falsity of the information furnished, and this despite the fact that the correctness of the boring information was not guaranteed and was not incorporated into the contract.[1]

In another case,[2] where a similar issue was involved in connection with a subway contract, the court stated: "It is well settled law that under a contract such as we have here, in which it is specifically stipulated that the city does not guarantee the completeness or correctness of the borings, or of the results thereof, the city is nevertheless liable if it knowingly misrepresents the conditions, or if it withholds from the contractor any material information of which the city had knowledge and which if disclosed would have tended to indicate the incorrectness of the boring sheets attached to the contract. In other words, implicit in a contract of the kind we are considering is the requirement that the city shall act in good faith."

• Case No. 2

In another case, a contractor for construction of a sewer was involved. The work was done on a unit price basis. The specifications and contract set forth that the material to be excavated would be earth. When the contractor performed the work, he discovered that the entire site of the work was underlaid with a compacted mass of large broken rocks which greatly increased the cost of doing the work. After the work had been completed and the contractor had been paid in full, he learned that the municipality for which the work was done had placed the rocks under the site of the work many years ago and had failed to disclose this information to the contractor at the time bids were asked for the work in question.

Upon learning that the city had filled the street with the rock, the contractor brought an action to rescind the contract on the ground that the failure to disclose such information constituted constructive fraud. The contractor obtained a recovery for the difference between the fair and reasonable cost of performing the work and the contract price.

• Case No. 3

Another case, where concealment of material information caused an increase in the cost of the work and where the contractor was allowed to recover for such increased costs, is where a Board of Education asked for bids for the erection of a school building. The work was to be performed under four separate contracts; (1) general construction, (2) plumage and drainage, (3) heating and ventilating, and (4) electrical work and fixtures. The total amount of the bids for the job exceeded the amount appropriated, so that only the general and electrical contracts were let. The other two contracts were not let until six months thereafter. At the time the general and electrical contracts were entered into, the contractors were not informed that the other two contracts had not been awarded.

The electrical contract was to be performed in 405 days but owing to the failure to award the other contracts, it took the electrical contractor 880 days to complete the job, which delay greatly increased the cost of performing the work. The contractor's action was dismissed by the lower courts, but the Court of Appeals held that the contractor was entitled to recover for the increased cost of the work resulting from the failure on the part of the city to award all the contracts at the same time. That court held that the failure to disclose to the electrical contractor that the two other contracts had not been let constituted constructive fraud.

The Court of Appeals stated: "Silence by the defendant (city) as to a change in plans so important to the timely performance of the work plaintiffs (contractors) were about to undertake served to mislead them into a false assurance that the work contemplated by their bid would progress according to plan along with the integrated work of the other three contracts. True, no duty rests upon a party to a contract to speak where silence does not constitute deception. Silence may, however, constitut fraud where one of the two parties to a contract has notice that the other is acting upon a mistaken belief as to a material fact."

• Case No. 4

In a recent case in Michigan, the court held that the withholding of information as to subsoil conditions that a contractor for a sewer job would encounter during the performance of the work constituted a basis for a cause of action to recover for the increased cost of the work resulting from encountering unusual subsoil conditions.

The invitation to bidders contained the following provisions:

"Construction Conditions. It is required that each bidder will examine the drawings and specifications for this work and make a personal examination of the site of the proposed work and its surroundings.

"Subsoil Conditions. Borings have been made and logs thereof are recorded on the drawings. This information is offered to the bidder merely as evidence and the bidder himself must assume responsibility for any conclusions which he may draw from it."

The contractor, during performance of the work, encountered unusual quantities of quicksand and an excessive amount of water which had not been

shown on the plans which were exhibited to bidders. After some work had been performed on the job and the above referred to unusual conditions were encountered, the route of the sewer was changed to circumvent these conditions, but the change was not successful in avoiding the unusual subsoil conditions.

At the trial, the evidence disclosed that the city, as a result of previous sewer work done by it, had knowledge that these conditions would be encountered but failed to indicate the same on the drawings.

The contractor obtained a recovery which was affirmed on appeal.[5] The appellate court stated: "The withholding by the city of its knowledge of the known conditions, resulting in excessive cost of construction, forms an actionable basis for plaintiff's (contractor's) claim for damages. Nor does the requirement that the contractor examine the specifications and make a personal examination of the site bar the plaintiff from recovering damages caused by the undisclosed subsoil conditions."

The ruling of the Michigan court is in line with the New York cases previously referred to. The attempt to relieve itself from liability for the increased cost of the work resulting from fraudulent misrepresentations or concealment of material information is of no avail. As was stated by the New York Supreme Court,[6] "A party to a contract cannot, by misrepresentation of a material fact, induce the other party to the contract to enter into it to his damage, and then protect himself from the legal effect of misrepresentation by inserting in the contract a clause to the effect that he is not to be held liable for the misrepresentation which induced the other party to enter into the contract. The effect of misrepresentation and fraud cannot be thus easily avoided. If it could be, the implied covenant of good faith and fair dealing existing in every contract would cease to exist."

(1) McGovern v. City of New York, 202 App. Div. 317, 195 N.Y.S. 925; Hopkins v. City of New York, 217 App. Div. 790, 217, N.Y.S. 213.

(2) Johnson Corp. v. City of New York, 162 Misc. 665, 295 N.Y.S. 547, affirmed 251 App. Div. 811, 298 N.Y.S. 188.

(3) Nordone Contracting Co. Inc. v. City of New York, 269 App. Div. 1035, 59 N.Y.S. 2d 256.

(4) Bank v. Board of Education of City of New York, 205 N.Y. 119.

(5) Valenti v. City of Adrian, 79 N.W. 2d 885, Dec. 28, 1956.

(6) Jackson v. State of New York, 210 App. Div. 115, 205 N.Y.S. 658, affirmed 241 N.Y. 563.

Substantial Performance Under Contracts

The question of whether a contractor has substantially performed his contract is one of fact. If the fact is disputed, the question is a proper one for a jury to consider. If the jury finds substantial performance, then the contractor may recover the contract price, less a fair allowance to the owner for the contractor's omissions.

In a New Jersey case that explains the law, the owner of a house on which a contractor was working sued the contractor for damages for failure to complete the work and for the cost of remedying defects in the work that had been performed. The contractor also brought an action against the owner to recover a balance that the contractor claimed was due for the work performed. The two actions were consolidated and tried together.

The contract price for building the house was $19,500, which was to be paid in scheduled payments specified in the contract. The contractor proceeded with the work and had been paid three payments, but at the time the fourth payment became due, a dispute arose between the parties, the owner claiming that at the time the contractor claimed that the fourth payment was due, the contractor had not performed all the work he was supposed to do to be entitled to the payment. Accordingly, he paid the contractor only such portion of the fourth payment as he thought the contractor was entitled to. Upon the refusal of the owner to pay the contractor the full amount of the fourth payment, the contractor filed a notice of lien. The owner asked the contractor to discharge the lien as it was obstructing his mortgage transaction and the owner told the contractor if he did not do this, he should not proceed to do any more work on the job. When the contractor's men came on the job to clean up, they were chased away. The resulting actions were then instituted.

At the time the work had been stopped, the contractor had been paid $11,900, leaving a contract price balance of $7,600. At the trial, conflicting expert testimony was offered by both sides as to the amount of damage and the matter was submitted to the jury to determine how much was due to either or both parties. The jury brought in a verdict in favor of the owner for

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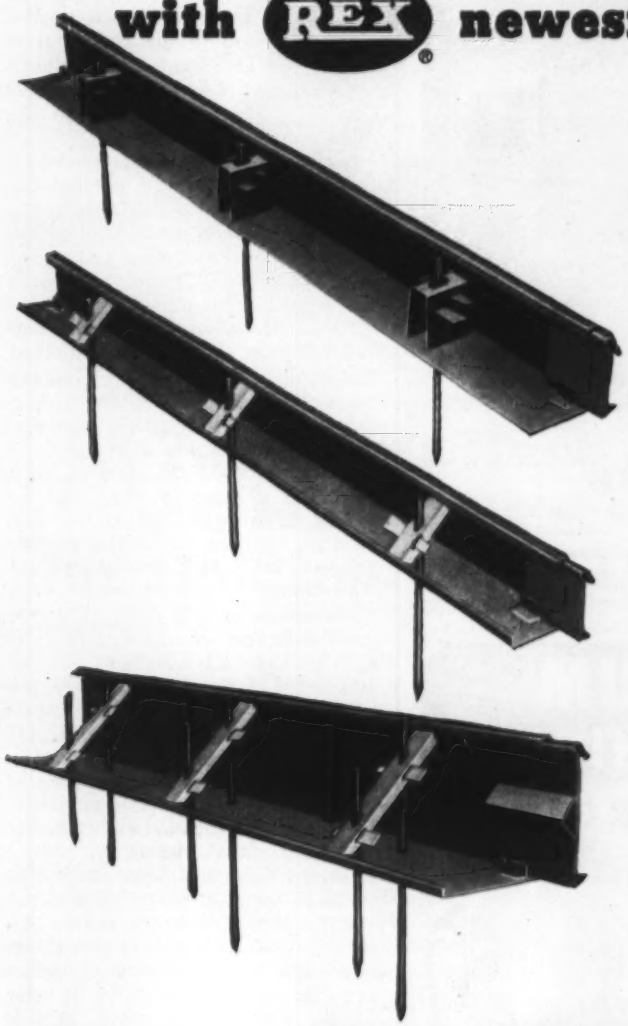

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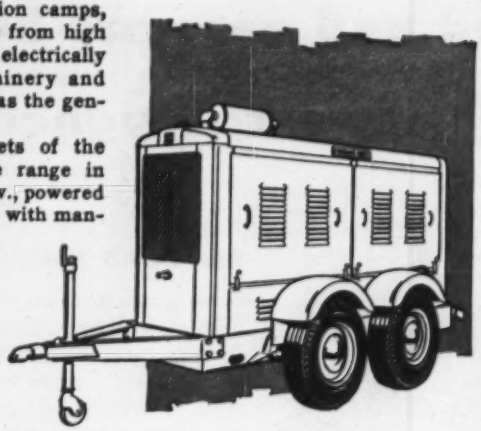

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$1,516.55 for unfinished work and $4,558 for defective work, the total verdict in favor of the owner being in the amount of $6,074.55. The jury also brought in a verdict in favor of the contractor in the amount of $10,726.38, which represented the balance of the contract price plus certain extra work. Thus the verdicts resulted in a net award to the contractor of $4,651.83. The court added interest in the amount of $480 to the judgment granted to the contractor. From this judgment the owner appealed.

In its appeal, the owner contended that the contractor had not substantially performed the contract and therefore was not entitled to any recovery; also that the trial court erred in allowing the contractor interest on the judgment.

As to the claim that the contract had not been substantially performed, the appellate court stated: "A building contractor is not entitled to recover unless he has substantially complied with the contract, but if he has, he is entitled to recover the contract price, less a fair allowance to the owner for minor defects or omissions." Many cases are cited to sustain this proposition of law. The court also said: "Substantial performance is compliance in good faith with all important particulars of the contract. 17 C. J. S., Contracts, Section 509, p. 1087. '* * * there is substantial performance of such a contract where all the essentials necessary to the full accomplishment of the purposes for which the thing contracted for has been constructed are performed with such an approximation to complete performance that the owner obtains substantially what is called for by the contract.' 9 Am. Jur., Building and Construction Contracts, Section 42, p. 31. A builder's default should not be wilfull, nor the defects so serious as to deprive the property of its value for the intended use, nor so pervade the whole work that a deduction in damages will not be fair compensation. 3 Williston on Contracts (rev. ed.), Section 805, p. 2256 et seq.

"Where there is conflicting testimony as to whether or not the contractor has substantially performed the contract, the issue is to be determined by the trier of the facts. Here, the questions pertaining to the extent of performance, abandonment, the uncompleted work and the defective work were disputed issues of fact, and, therefore, were properly submitted to the jury. Brannworth v. Borough of Verona, 94 N. J. L. 194, 109 A. 343 (E. & A. 1920). The verdict of the jury under the charge of the court

***Right:** John Deere Crawler-Loader working in marl (half earth and half rock). Outfit owned by Fred W. Woody, Rt. 2, Smyrna, Georgia, and operated by Carl Everett.*

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determined that Donna Brook (contractor) did not abandon the contract, but substantially performed, within time; and by its verdict for Jardine (owner) made an allowance for the defects and omissions. Support for these awards can be found in the testimony and we see no reason to disturb them."[1]

The appellate court held that in view of the fact that there was a serious dispute as to the amount due the contractor and the amount was unliquidated and not capable of ascertainment by mere computation, it was improper to allow interest on the judgment granted the contractor.

The judgment of the trial court was affirmed but interest thereon was eliminated.

(1) Jardine Estates v. Donna Brook Corp., 126 A. 2d 372, Superior Court of New Jersey, Nov. 2, 1956.

Materialmen Recover From Money Withheld

A Texas court has ruled that materialmen, as third-party beneficiaries, can recover from a fund established under a contract between the prime contractor and a subcontractor. The facts were these:

The prime contractor of a construction project sublet part of the work to another contractor. In letters exchanged between the prime contractor and subcontractor, it was agreed that the prime contractor would retain from the money due the subcontractor certain sums to secure payment for materials furnished the subcontractor for the performance of his part of the job.

The subcontractor defaulted in making payment to some persons furnishing materials for the job, and the suppliers brought an action against the prime contractor for payment out of the funds withheld by the prime contractor.

They obtained a recovery. The court held[1] that, although the materialmen were not parties to the contract, the agreement between the prime contractor and subcontractor was clearly made for the benefit of such materialmen and they could bring an action for payment from such funds.

(1) Wells-Grinnan M.A.B. v. Belton Sand & Gravel Co., 293 S.W. 2d 70, Court of Civil Appeals of Texas, June 13, 1956.

These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.

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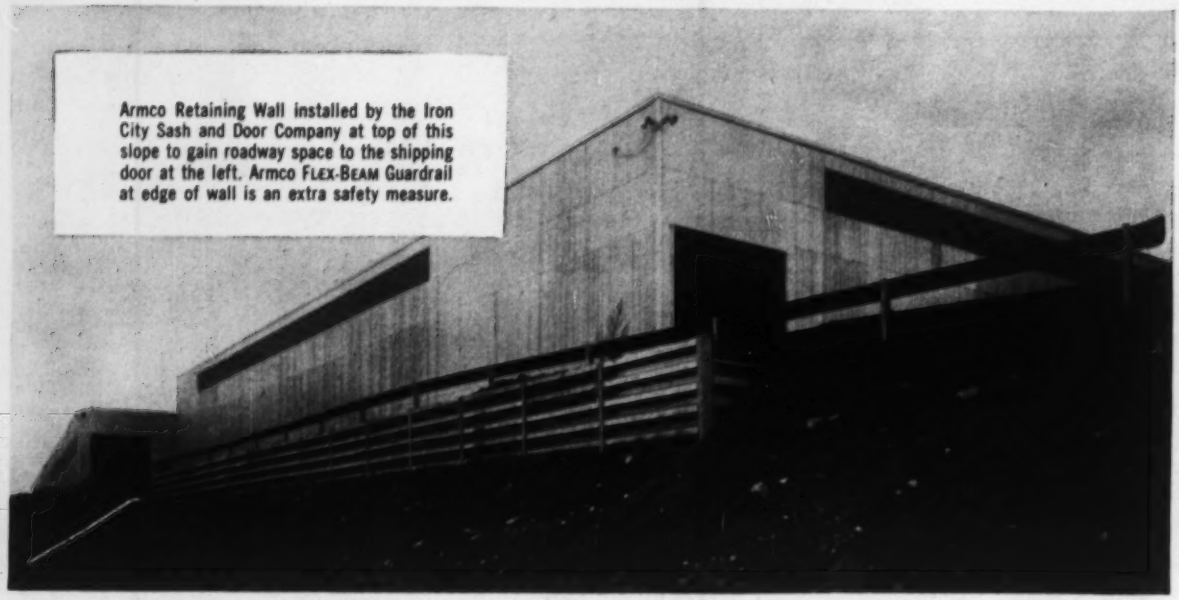

Armco Retaining Wall installed by the Iron City Sash and Door Company at top of this slope to gain roadway space to the shipping door at the left. Armco FLEX-BEAM Guardrail at edge of wall is an extra safety measure.

"An Armco Retaining Wall Cut Our Costs Almost in Half"

So said an official of The Iron City Sash & Door Company, Pittsburgh, Pa., about an Armco Bin-Type Retaining Wall installed on a slope adjacent to the company's new warehouse to provide roadway area.

This was the problem: A shipping dock needed for the warehouse was located along the top of a slope bordering a railroad yard. There was not enough room to assure vehicle safety, so a retaining wall had to be built to provide ample space for trucks. Considered for the job was an Armco Retaining Wall and a conventional type of monolithic wall.

The Armco Wall got the job because, as the company said, "It was about half the cost."

This wall is 150 feet long and 6⅔ feet high. To provide extra safety, Armco FLEX-BEAM® Guardrail has been installed along the edge of the wall.

• • •

All-metal Armco Retaining Walls are composed of deeply corrugated sections. When bolted together, the sections provide sturdy cellular bins that are backfilled with earth to assure stability. These walls are used to stabilize slopes, increase roadway widths, hold back fills or simplify grade separations. They are specified for highway, railway and industrial applications.

Armco Retaining Walls are one of many Armco products designed for drainage and construction work. Write us for data, telling us about your problem. Armco Drainage & Metal Products, Inc., 4467 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

This photo shows the Armco Wall during installation.

ARMCO CONSTRUCTION PRODUCTS

ARMCO®

Books

Emphasis on Sewers

SEWERAGE AND SEWAGE DISPOSAL—By L. B. Escritt, 412 pp. Contractor's Record Ltd., Lennox House, Norfolk St., London, England. 45s ($6.30)

The well known author has drawn from two of his previous books, *Sewerage Design and Specification* and *Sewage Treatment: Design and Specification*, with appropriate updating to produce his current work. It is divided equally between collection and treatment of sewers.

Although the subject of sewage treatment has been covered rather well in several recent books, Escritt's discourse is valuable in that it brings to the fore contemporary English practice. However, his coverage of the less glamorous collection phase of waste disposal is likely to prove more useful in that much in the way of recent findings is included. There are chapters on storm water runoff, surcharged sewers, siphons, pumping, outfalls, manholes, construction of sewers and flushing and ventilation of sewers.

Electronic Computers

MATHEMATICS AND COMPUTERS—By George R. Stibitz and Jules A. Larivee, 228 pp. McGraw-Hill Book Co., 330 West 42 St., New York, N. Y. $5.

FASTER, FASTER—By W. J. Eckert and Rebecca Jones, 160 pp. McGraw-Hill Book Co., $3.75.

In the past two years a rash of books have been published on the glamorous new engineering tool of electronic computing, but almost all of them fall short of providing a clear picture of the nature and operation of computers in language a prospective user can readily understand.

However, authors Stibitz, a mathematician who has pioneered in computer work, and Larivee, a mathematics professor at Worcester Polytechnic Institute, have written a book free of ponderous language that conveys a broad understanding of automatic high speed computers, both the analog and digital variety. They show by means of exceedingly simple illustrative examples just what a computer does and, importantly, what it does not do.

Particularly outstanding are several chapters presenting a perceptive history of automatic computers and a breakdown of the types of numerical analyses computers are capable of.

The reader desiring an understanding of just how these new machines actually add, subtract, multiply, divide, store information and operate continuously will find it in *Faster, Faster*, published in 1955 but not reviewed then because electronic computers still were predominately tools for scientists.

Unlike most other books in the field, which attempt to cover all of the various computer systems and so become unhappily generalized, Faster, Faster is limited to a description of just one giant-size digital computer (NORC for Naval Ordnance Research Calculator). But in discussing the innards of NORC in surprisingly easily understod language, the authors succeed in making clear the methods governing operation of all other digital computers, the type becoming most popular in the civil engineering field

Mathematics and Computers and *Faster, Faster* supplement each other especially well. Together they provide the clearest understanding of electronic computers yet available to this magazine.

Miscellaneous Notes

• **Water used by steam plants**—Summary results of a Federal Power Commission survey of water used in steam generation of electric power in 1954 is available from the Business and Defense Services Administration, Department of Commerce, Washington, D. C. U. S. totals are 65,500 mgd intake plus 8,950 mgd recirculated. Per kwh, this converts to 66 and 9 gal respectively, based on total generation of 361 billion kwh for the year. Somewhat surprisingly, almost 30% of the water intake came from public supply systems; almost all the remainder, from self-operated surface systems.

• **Analog computers**—Proceedings of a symposium on applications of analog computers sponsored by the Midwest Research Institute in April, 1956, now are available in a 210 page publication. The various papers presented and subsequent round table discussion, especially, provide a useful insight into the management and operation of these high speed machines (which are a distinctly different breed from digital computers). Of particular interest to civil engineers is a paper by Edward A. Lawler of the Ohio River Division, Corps of Engineers, which describes in detail use of the analog computer for calculating flood routing, surges in sewers and air vents in pressure water lines. The report is priced at $5.00 and may be ordered from Midwest Research Institute, 425 Volker Blvd., Kansas City 10, Mo.

(*Books continued on p. 112*)

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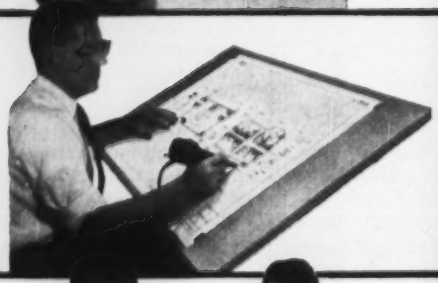

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. . . Books

• **Canadian Bidding Guide**—A new bidding guide issued by the Canadian Construction Association, 151 O'Connor Street, Ottawa, Canada, and the Royal Architectural Institute of Canada features recommended practices where competitive lump-sum bids are requested for construction projects.

The purpose of the booklet is primarily to eliminate waste and establish "a friendly spirit of cooperation" between the contracting parties and the architects.

Entitled "A Suggested Guide to Bidding Procedure", it is designed for the use of construction firms, designers and owners.

Included are sections on the preliminary investigation, drawings, specifications, bidding, sub-contracts and separate contracts. A copy of the Canadian standard form of construction bid and a list of standard contract forms, are included as appendices.

The guide is patterned after that of the American Institute of Architects and the Associated General Contractors of America, with modifications to suit conditions in Canada. The work bears the approval of both the CCA and the CAIC.

Reports and Pamphlets

ARCHITECTURAL GRAPHIC STANDARDS—Fifth Edition. 758 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $18.50.

FLEXIBLE CULVERTS UNDER HIGH FILLS—Bulletin 125. 177 pp. Highway Research Board, 2101 Constitution, Washington, D. C. $3.30.

SYMPOSIUM ON IMPACT TESTING—Special Teechnical Publication No. 176. 170 pp. American Society for Testing Materials, 1916 Race St., Phila. 3, Pa. ASTM members $2.65; non-members $3.50.

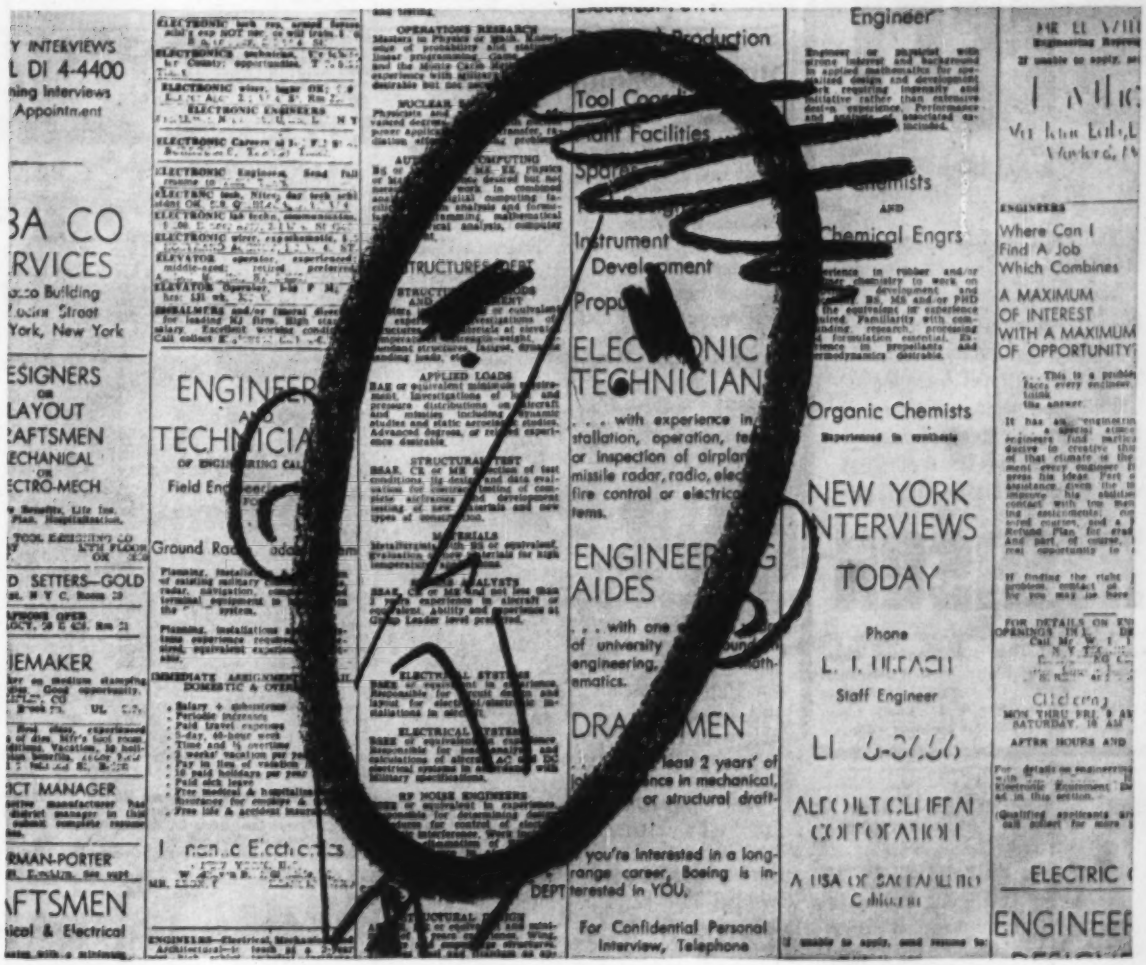
CONTRACTS, SPECIFICATIONS AND ENGINEERING RELATIONS—by D. W. Mead and J. R. Akerman. 427 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $7.00.

IRRIGATION ENGINEERING—Volume II.—by Ivan E. Houk. 531 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $14.00.

DESIGN IN CIVIL ARCHITECTURE—Vol. 1: Elevational Treatments—by A. E. Richardson and Hector O. Corfiato. 216 pp. Philosophical Library, Inc., 15 E. 40th St., New York 16. $15.00.

ENGINEERING ANALYSIS—by Stephen H. Crandall. 417 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $9.50.

2525 REVIEW QUESTIONS FOR SURVEYORS—by Russell C. Brinker. 200 pp. R. C. Brinker, Box 153, Blacksburg, Va. $3.50.



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Missouri Sanitary Sewer Includes Tunnel Section

This 34,000 lin ft interceptor and trunk sewer system includes a concrete lined rock tunnel. Springfield, Mo., let the work in three contracts totaling $2,002,513. Consoer, Townsend & Associates, Chicago, Ill., are the consulting engineers.

The first contract, $1,106,175 for one of the tunnel sections was awarded on the second low bid to Whittle Contracting Co., Dallas, Tex., although it tops the low bid by 12.3% and the engineer's estimate by 10.5%. The low bidder did not conform to the instructions for bidders on several points, nor was his 5% bid security adequate. In addition to 7,500 lin ft of 60 in. monolithic concrete lined tunnel, work includes 720 lin ft reinforced concrete pipe in encasement and in open cut.

The second contract, $676,563 for main interceptor sewers to Peter Kiewit Sons' Co., Springfield, is 16.9% below the engineers estimate and 4.5% below the second low bid. This 12,080 lin ft of 60 in. and 48 in. reinforced concrete pipe offers a tunnel option for an 1,100 lf section.

The third contract, $219,775 for the 13,631 lin ft trunk sewer sewer extension went to Hamby Excavating Co., Springfield, who underbid the nearest competitor by 12.8% and the engineer's estimate by 10.3%. Vitrified tile and reinforced concrete pipe, 10 in. and 21 in., include sections in tunnels.

Tunnel, Wilson Creek to South Creek

1 T. F. Scholes Inc., Camden, Ark. $985,115
2C Whittle Contracting Co., Dallas, Tex 1,106,175
7 G. L. Tarlton Contracting Co., and Fruin-Colnon Contracting Co., St. Louis, Mo 1,778,955
EE Consoer, Townsend & Assoc., Chicago, Ill 1,001,000

Bids: 12-14-57 Items	Unit	Quantity	Unit Prices 1	2C
Sewer, RCP, 60"	lf	100	$42.00	$50.00
60", conc encas	lf	620	60.00	80.00
tunnel, 60", monolithic conc lined	lf	7,500	115.00	132.00
MH base chamb, RC, type 4	ea	1	3,000	2,000
type 5	ea	1	3,000	1,800
type 6	ea	2	3,000	1,700
type 7	ea	1	5,000	3,200
sidewall, circular, 60"	vf	220	60.00	72.00
frame & cover, CI	ea	6	65.00	75.00
sidewall, circular, 48", incl steps	vf	20	45.00	50.00
ladder, aluminum	vf	240	25.00	37.00
Drop pipe, CI, & fittings	lb	10,500	0.25	0.30
Excavation, rock	cy	2,500	10.00	6.00
Base crse, grav or cr stone, with seal coat	sy	50	5.00	3.70
Pvmt, bit surf, replace	sy	50	7.00	5.00
conc, replace	sy	50	10.00	7.00
Conc, cradle and/or encasmt cl A or B for struct addn	cy	20	55.00	30.00
	cy	20	100.00	50.00
Stl, reinf, for struct addn	lb	2,000	0.20	0.15
Bkfl, sand or grav	cy	200	5.00	4.50
Refill, grav or cr stone	cy	200	5.00	4.00
Sheeting & bracing, left in	Mfbm	3	500.00	100.00
Timber, sewer fndn	Mfbm	5	500.00	100.00
Piling, wood	lf	200	10.00	2.50
Trees, elm and/or maple, replace	ea	10	200.00	37.00
Excavation, hand, misc	cy	100	10.00	5.00
Laborers' time	hr	100	5.00	3.00
Bidder		1	2C	7
Time to complete, calendar days		.....	500	730

South Creek Main Interceptor Sewer

1C Peter Kiewit Sons' Co., Springfield, Mo $676,563
2 Quad City Const. Co., Rock Island, Ill 708,564
12 Samuel Kraus Co., St. Louis, Mo 1,159,294
EE Consoer, Townsend & Assoc, Chicago, Ill 814,000

Bids: 12-14-56 Items	Unit	Quantity	Unit Prices 1C	2
Sewer, RCP, 60"	lf	6,900	$34.80	$44.00
60", conc enc	lf	185	51.10	107.50
48"	lf	4,000	23.50	33.00
48", conc enc	lf	215	41.00	81.75
Sewer, RCP, and/or tunnel, mono conc lined, 60", 1,100 lf	ls	job	175,886	143,000
MH base chamb, RC, type 1, for sewer 60"	ea	8	1,400	1,500
48"	ea	3	1,000	1,000
Transition base chamb, ty 1	ea	2	1,300	2,000
MH sidewall, circular, 48", incl steps	vf	95	34.60	30.00
frame & covers, CI	ea	13	81.00	75.00
Excavation, rock	cy	25,000	4.95	3.00
Base crse, grav or cr stone with seal coat	sy	100	3.60	5.00
Conc. cradle and/or encasmt cl A or B for str addn	cy	100	26.90	45.00
	cy	10	120.00	100.00
Steel, reinf, for str addn	lb	1,000	0.16	0.20
Backfill, sand or gravel	cy	1,000	4.75	0.75
Refill, cr stone or gravel	cy	200	4.75	0.75
Sheeting & bracing, left in	Mfbm	5	125.00	100.00
Timber, sewer fndn	Mfbm	5	125.00	100.00
Piles, wood	lf	200	10.00	2.00
Trees, elm and/or maple	ea	10	50.00	100.00
Excavation hand, misc	cy	50	5.00	2.50
Laborers' time	hr	100	4.50	3.00
Excavation, machine, misc	cy	200	1.50	0.50
Bidder		1C	2	12
Time to complete, calendar days		450	365	365

Trunk Sewer Extensions—North & East Sides

1C Hamby Excavating Co., Springfield, Mo $219,775
2 C B. Contracting Co., Eldon, Mo 252,138
7 G. L. Tarlton Contracting Co. & Fruin-Colnon Contracting Co., St. Louis, Mo 368,190
EE Consoer, Townsend & Associates, Chicago, Ill. 245,000

Bids: 12-14-57 Items	Units	Quantity	Unit Prices 1C	2
Sewer, VTP, 21"	lf	700	$15.00	$11.00
18"	lf	4,800	12.00	9.75
12"	lf	240	6.50	6.50
10"	lf	5,300	6.00	5.75
RCP, 21"	lf	2,100	15.00	11.00
21", under RR tracks, in tunn	lf	111	70.00	100.00
under RR siding	lf	140	9.00	50.00
VTP, 18", under highways, in tunn	lf	80	50.00	75.00
CIP, mech jt, 20"	lf	140	18.00	25.00
18"	lf	80	16.50	25.00
MH base, conc	ea	51	30.00	25.00
Sidewall, 48"	vf	450	15.00	25.00
frame & cover, CI	ea	51	40.00	75.00
Drop pipe assemblies, 8"	ea	2	250.00	100.00
House sewer, 6", reconnect to new sewer	lf	50	5.00	3.00
Sewer riser pipes, 6"	lf	50	4.00	2.00
Excavation, rock	cy	6,000	8.40	12.50
Sidewalk, conc, replace	sf	100	1.00	2.00
Curb & gutt, conc, replace	lf	100	3.00	5.00
Curb, conc, replace	lf	50	1.50	3.00
Base crse, grav or cr stone with seal coat	sy	10	4.00	4.00
Pvmt, conc, replace	sy	20	12.00	10.00
bit surf, replace	sy	650	4.00	5.00
Driveway, conc, replace	sy	15	10.00	7.50
bit surf, replace	sy	10	3.00	5.00
Driveway or rdway replacement, grav or stone	sy	100	2.00	2.00
Conc, cradle and/or encasmt cl A or B, for struct addn	cy	20	20.00	40.00
	cy	10	25.00	80.00
Stl, reinf, for struct addn	lb	1,000	0.10	0.15
Bkfl, sand or gravel	cy	1,800	2.00	3.00
Refill, grav or cr stone	cy	200	2.00	3.50
Sheeting & bracing, left in	Mfbm	3	60.00	200.00
Timber, sewer fndn	Mfbm	3	70.00	400.00
Piling, wood	lf	200	1.50	10.00
Trees, elm and/or maple, replace	ea	10	50.00	500.00
Exc, hand, misc	cy	150	2.50	15.00
Laborers' time	hr	100	2.20	5.00
Bidder		1C	2	7
Time to complete, calendar days		450	365	730

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Length — in.	9	14.12	16.75	17.25	21.75
Weight — lb.	40	95	125	135	195
Output — lb/min. (Standard Conditions)	25-40	35-65	35-65	70-95	115-175

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Materials and Labor Prices — Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Iron and Steel Products: Last, Mar. 14; Next, Apr. 11
- Wood Products, Glass, Explosives, chemicals: Last, Mar. 21; Next Apr. 18
- Clay Products, Lime, Plaster, Paint, Roofing: Last Mar. 28; Next, Apr. 25
- Wage Rates, Building Board, Lath, Insulation: Last, Mar. 28; Next, May 2

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots cash, dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.' truckload del.' per block		CONCRETE Ready Mixed 1:2:4 del. 50 cy & over
	Paper	Bulk	Mortar	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt. wgt. agg.	
Atlanta	$4.31a	$3.90a	$3.87	$2.18	$2.28	$2.50‡	$2.18	$2.33	$1.55	$1.65	$0.175	$....	$13.75g
Baltimore	4.43c	4.01c	3.49c	3.80‡a	3.80‡a	2.25‡a	2.80‡a	2.80‡a	2.05‡a	2.00‡a	.18	.18a	12.95
Birmingham	4.08	3.15a/	....	3.53a	3.53a	3.13a	2.75	2.75	1.55	1.65	.18	.18	12.55
Boston	5.25ha	4.67a	4.79a	3.00a	3.00a	3.00a	1.65a	1.80a	....	....	.23	.275a	15.00h
Chicago	4.13a	3.72a	3.87	3.78‡b	3.78‡b	4.13‡b	3.95‡b	3.95‡b	2.35‡	2.35‡	.25	.25b	13.50
Cincinnati	4.22c	3.81c	3.90	3.29‡c	3.34‡c	2.34‡c	3.64‡c	3.64‡c	....	....	.205	.25a	13.40
Cleveland	N.A. in C.L.	3.74	....	3.15ef	1.95/	1.65	4.30‡a	4.30‡a	3.30‡a	3.30‡a	....	.22	16.15
Dallas	3.58a	3.15a	3.43	3.61	3.64	1.98	2.43	2.63	....	....	....	.27	11.25
Denver	4.69a	4.19a	4.69	1.90	2.05	1.30	....	....	....	....	.23	.345a	10.70
Detroit	4.10a	3.60ag	3.73	4.50‡b	4.50‡b	4.25‡b	3.75‡	3.75‡	3.80‡	3.80‡	.25	.34a	14.20
Kansas City	4.45b	4.25b	4.25	....	....	1.70‡a	2.00‡a	2.00‡a	....	....	.31a	.34c	13.80
Los Angeles	5.12ah	4.68ah	5.60	2.41‡a	2.76‡a	2.41‡a	2.41‡a	2.46‡a	....	....	1.44¢/m	.355m	13.95h
Minneapolis	4.68a	4.27a	4.27	3.70‡ag	3.70‡ag	1.60‡ag	3.25‡ag	3.25‡ag	....	....	.19	....	14.20/
Montreal	5.11d	2.86d	5.50	1.95‡a	2.20‡a	2.25‡a	1.95‡a	2.20‡a	....	....	.20	.30a	10.80ah
New Orleans	3.75a	3.45a	3.70	3.44	3.44	2.00	....	....	1.45	1.65	.275	....	13.65
New York	4.79a	4.38a	3.88	3.05hh	3.05hh	2.30hh	2.90hj	2.90hj	....	....	.35	.30b	16.75an
Philadelphia	4.49/4.84‡a	4.09/4.46‡a	3.70/4.33‡	2.85‡ep	2.85‡ep	2.35‡ep	2.70‡	2.90‡	2.00	2.35	.24/.30	....	13.80dz
Pittsburgh	4.15a	3.76a	3.75	3.40‡	3.40‡	2.20‡	2.60‡	2.60‡	2.15	2.15	.25d	.31	14.00
St. Louis	4.01/4.33a	3.61/3.93a	3.86/4.18	3.25an	3.10an	2.40/2.10am	1.60j	1.70j	....	....	.24	.30a	12.40/12.90
San Francisco	3.94z	3.84z	....	3.02	3.02	2.12	2.17	2.17	....	....	.24	.28d	13.75z
Seattle	4.30a	3.75a	....	4.00‡bm	4.00‡bm	4.00‡bm	4.50‡bm	4.50‡bm	....	....	.26	.37c	13.80y
Toronto	4.08	4.08	4.08	2.40‡	2.40‡	2.06‡	2.20	2.20	2.20	2.20	.25	.30c	15.25

‡ Delivered. * Prices incl. dealers discount except as noted.

CEMENT: *a Less 10¢ disc, 15 days. *b Less 2% disc, 15 days. *c Less 10¢ disc, 10 days. *d Truckload lots, deliv. 10¢ disc, 20 days. *e Truckload lots *f Fob mill, add $13.89 to $20.31 per car switching charges *g fob mill + freight *h LCL.

SAND GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons or more. *e ¼". *f Pea gravel. *g Less 5% for cash. *h Less than 5 tons. *i Plus 5% mun. & prov. tax *j F.o.b. quarry. *k Barge lots and. *l F.o.b. snow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *o 1-3 mi zone. *p Add 10¢ for ea. add'l mi zone.

CONCRETE BLOCK: *a Cinder *b Waylite. *c Haydite. *d Colorock *e 8½ x 8 x 12 in. *f 8 x 4 x 16. *g F.o.b. truck at job. *i Less 2%, for cash *j F.o.b. plant San Rafael. *m F.o.b. yard.

READY MIXED CONCRETE: *a 5 cu. yds. or over del. Man. *b 25 cu. yds or more *c 10-100 cy. brackets. *d 1-3 mi. zone. *g 2,000 lb comp. *f 2,500 lb. comp. *g Less 25¢ disc, 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 5% mun. & prov. *l 1:2½:3½. *m F.o.b. yard *n Plus escalator clause. *o Add 15¢ for ea. add'l 3-mi zone.

CASH DISCOUNTS CEMENT to Contractors: Truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10¢ per bbl. for paymen within 15 days of date of invoice. Subject discount 10¢ per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not included. For paper bags add 40¢ per bbl., not refundable.

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn	$3.30†	Buffington, Ind	$3.25†	Steelton, Minn	$3.45†	Muskegon, Mich	$3.30†	Toledo, O	$3.30†
Clinchfield, Ga	3.30†	Independence, Kan	3.10†	Leeds, Ala	3.15†	Saginaw, Mich	3.30†	Milwaukee, Wis	3.35†
Kingsport, Tenn	3.30†	Hannibal, Mo	3.35†	Duluth, Minn	3.45†	Wyandotte, Mich	3.30†	Green Bay, Wis	3.35†
West Des Moines, Iowa	3.35†	Northampton, Pa	3.35†	Hudson, N. Y	3.35†	Buffalo, N. Y	3.40†	Ironton, O	3.30†
Nazareth, Pa	3.35†	Universal, Pa	3.45†	Alpena, Mich	3.20†	Oswego, N. Y	3.45†	Montreal City	2.50†
Bath, Pa	3.35†	Waco, Tex. (+ 10¢ tax)	3.35†	Detroit, Mich	3.30†	Cleveland, O	3.35†	W. Winfield, Pa	3.45†
Lesley, Pa	3.35†	Giant, S. C	3.35†	Howes Cave, N. Y	3.35†	Alson, N. Y	3.35†	Security, Md	3.35†

† *Prices to hold for second quarter of 1957.*

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT		ASPHALT BINDERS—FLUXES		CUTBACK ASPHALT MC		ROAD OIL	ASPHALT EMULSION RSI	
	Granite Per M lots of 80,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	Per ton, less than 80 penetration		Per gal., 80-300 penetration		per ton		Per gal.	Per gal.	
				Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	.....	.....	.....	$30.50	$45.00	$0.15	$0.26	$0.125Pw	$0.28Pw	$0.14	$0.125	$0.30
Baltimore	180.00‡	.....	.....	23.00s	.....	.095s	0.185d	.10wE	.19wE	.10i	.108d	0.195d
Birmingham	.....	82.00i	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston	.....	.....	.....	24.00ap	46.00ap	24.00as	46.00as	.11aPw	.24aPw	.11ao	.174aGo	.25aGo
Chicago	180.00‡	90.00‡b	3.95/4.00‡j	24.05b	34.05b	21.40bv	31.40bv	.11bwH	.19bwH	.085b	.....	.....
Cincinnati	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland	.....	82.00d	6.30g	25.00A	.....	25.00A	.....	.111AwF	.....	.....	.111AG	.214G
Dallas	e	40.00	e	26.35	45.39	.1116	.1944	29.80	51.40	.1060	.1116	.1994
Denver	.....	80.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	.....	113.00	.....	32.45	.....	31.45v	.....	.1338wJ	.....	.1133	.....	.26
Kansas City	e	e	e	21.00cl	.....	21.00v	.....	.097½wJ	.....	.085v	0.125v	.....
Los Angeles	e	.....	e	18.50dmz	.....	18.50dmz	.....	20.00dx K	.....	19.00dv	.09j	.19j
Minneapolis	.....	.....	3.73h	29.50	.....	29.50	.....	0.125w	.....	0.115	.134	.....
Montreal	e	e	e	32.50n	44.80n	.176n	.226n	18.70wuE	23.70wuE	.154n	.342ns	.270ns
New Orleans	.....	.....	.....	17.60v	..... e	17.60vv	 v	.088vv	..... e	.088B	.09BL	.....
New York	.....	.....	3.70/	26.89wCD	47.32wD	26.89wCD	47.32wD	.1273wCDF	.2130wDF	.....	.1273CD	.2168D
Philadelphia	175/185	110/120	4.06	22.00	.....	22.00	.....	.098wF	.....	.095	.....	.....
Pittsburgh	165.00	48.00	4.60	27.00	38.00	.10	.21	27.00E	40.00E	.098	.11	.234
St. Louis	.....	.....	.....	20.63/	.....	.1764	.....	.0925/wM	.....	0.16	.106	.....
San Francisco	.....	70.00u	.....	23.00y	40.00y	23.00qbv	40.00qbv	24.00yN	41.50yN	23.75ay	.10y	.19y
Seattle	.....	.....	.....	27.00z	40.50d	27.00z	.....	28.50K	.....	24.75bz	.10d	.11dr
Toronto	.....	.....	4.50	40.10	59.38	0.2045	0.2445	0.214w	0.288w	0.198	0.216	.271

‡ Delivered.

PAVING BRICK & BLOCK: *b 3 x 4 x 8. *c 2¼ x 3½ x 4. *d LCL, truck deliveries. *e Not used. *f 2" interior 6/ treat. *g 3" *h 2" br, 6/ *i 3 x 3½ x 8½. *j 2½", 6 lb. br.

ASPHALTS: *a Price at plant, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segunda. *e F.o.b. Baton Rouge. *f F.o.b. Hartford, Ill. *g F.o.b. Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 penetr. *l Less than 100 penetr. *m 40/50 penetr. *n Fed. tax included; add 5% for mun. & prov. *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *q 40/50 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 85/250 penetr. *u Per 10‡ gal. *v Per ton. *w Per gal. *x Also tank trucks. *y F.o.b. Oakland *z F.o.b. Edmonds *A F.o.b. refinery, Cleveland. *B F.o.b. Destrehan, La. *C Bulk. *D Prices based on transporting to Manhattan via truck. *E RC. *F Also RC. *G Also MG, SS. *H RC 0-5 inst. *I MC 4. *J MC, RC .0575. *K MC 3, 4 & 5. *L MS. *M MC 1-5, RC 1-5, .092. *N MC 3. *O Truckload *P F.o.b. refinery Savannah: $0.09/gal., tank cars; $0.20/gal., drums.

Roadbuilders!

START WITH ONE PAVER...
GROW with the BUTLER TX-4!

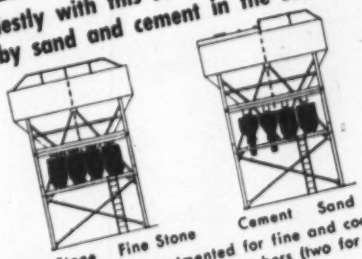
New Butler One-Man Batching System Matches 1, 2, 3 or 4 Dual Drum Pavers

The New Butler TX-4 Roadbuilder Plant offers you ONE MAN operation with ultra-high speed automatic batching — no matter if you operate one paver — or two . . . or three . . . or four . . . or more!

Typical automatic TX-4 bin and batcher. Controls are pre-set on each bin, operate by push-button.

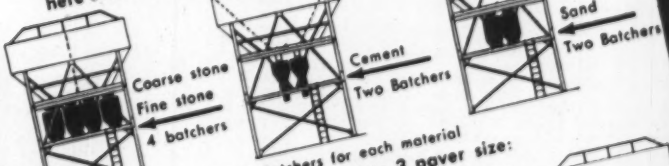
You can start modestly with this set up if your operation is best served by sand and cement in the same bin

1 or 2 pavers



Basic Unit. One bin compartmented for fine and coarse stone, the other for cement and sand. Eight batchers (two for each material) easily keep pace with one or two pavers.

Where separate bins are desirable for sand and cement, here's the one and two dual-drum paver set up.

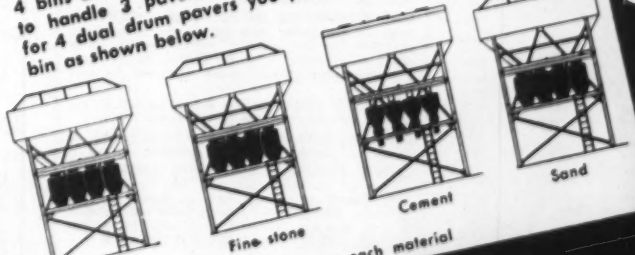


Two Batchers for each material

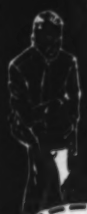
Now as you grow to 3 paver size:

3 and 4 pavers

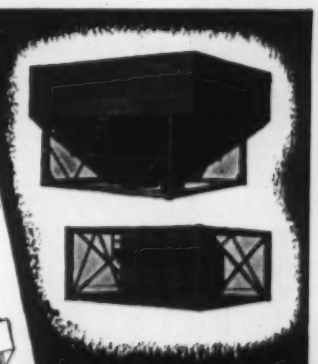
4 bins are equipped with 3 batchers for each material to handle 3 pavers. Then when you want production for 4 dual drum pavers you just add a batcher to each bin as shown below.



4 batchers for each material



So no matter how modest or how large your paving operation, the versatile, highly portable, completely automatic Butler TX-4 fits your requirements like stretchable socks.



TX-4 is the most portable ever designed. Bins completely pre-assembled for easy crane handling. Batcher units handled with piping and wiring in place.

The Butler TX-4 is described right down to the nuts and bolts in this fact-packed Bulletin. Send a post card today. Just ask for Bulletin TX-4

BUTLER BIN COMPANY

947 Blackstone Ave. • Waukesha, Wisconsin

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

† **Conn., Groton**—TANK REPAIRS, etc.—BA 4/9—U. S. Naval Submarine Base, Officer in Charge of Constr., Groton, repairs and alterations to training tank, Bldg. 70, replace existing transformer with new 50 kva transformer, etc.

BUILDINGS—BA

Mass., Worcester—CHAPEL—BA 4/16—Venerini Sisters, Rev. Sister Maria Domenica, 23 Edward St., academy, chapel, auditorium, gymnasium, $550,000. Plans deposit $50, refundable $35. Anthony J. DePace, 151 W. 46 St., New York, N. Y., archt. CD 8/8.

HEAVY CONSTRUCTION—LB & CA

Perini Corp., Marine Div., 62 Condor St., East Boston, Mass. LB **$154,750,** est. $138,000. dredging easterly on State Pier, Fall River, MASSACHUSETTS. Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Mass. Bids Mar. 19. CD 3/13.

† **Ernest F. Carlson, Inc.,** 1694 Main St., Springfield, Mass. LB **$980,420,** est. $1,080,049. base communication bldg., Westover Air Force Base, ENG-19-016-57-165, CHICOPEE FALLS, MASS. U. S. Eng., 150 Causeway St., Boston, Mass. Bids Mar. 20. CD 2/18.

▲† **Daniel O'Connell's Sons, Inc.,** 480 Hampton St., Holyoke, Mass. CA **$1,158,773,** est. $1,000,000. off base communications bldg., Westover Air Force Base, ENG-19-016-57-165, CHICOPEE FALLS, MASS. U. S. Eng., 150 Causeway St., Boston, Mass. Anderson, Nichols & Co., 150 Causeway St., Boston, Mass., archts. CD 3/25, under LB.

CONNECTICUT—State Hy. Dpt., 165 Capitol Ave., Hartford,

F. D. Rich Co., Inc., 550 Summer St., Stamford, Conn., LB **$888,660** (4 bidders) 4 maintenance garages, incl. salt storage bldgs., jet sanders bldgs., parking areas, ramps, drives, etc., Branford, Stratford, Guilford, and Westbrook. Bids Mar. 18. CD 2/25.

▲ **White Oak Excavators, Inc.,** 61 Main St., Plainville, Conn., LB **$2,385,155,** (3 bidders) roadway approaches to Wolcott Ave. crossing over Connecticut River approx. 8,026 lin. ft. grading, drainage and b. conc. pavement, incl. 2-pre-stressed concrete girder grade separation structures, South Windsor and Windsor, HARTFORD, CONN. Hartford Bridge Auth., 71 Capitol Ave., Hartford, Conn. Bids Mar. 25. CD 3/8.

BUILDINGS—LB & CA

Sciaba & Co., Inc., 86 Shawmut Ave., Boston, Mass. LB **$647,086.** ELEMENTARY SCHOOL Henry Grew Site, Hyde Park, BOSTON, MASS. City, Dpt. School Bldgs., 26 Norman St., Boston, Mass. Bids Mar. 22. CD 3/11.

George E. Emerson, Inc., 34 Britton St., Pittsfield, Mass. CA Approx. **$500,000.** SCHOOL addn., alterations, Holmes Rd., PITTSFIELD, MASS. Miss Hall's School 492 Holmes Rd., Pittsfield, Mass. Bids Feb. 21. CD 1/25.

▲ **George A. Fuller Co.,** 11 Beacon St., Boston, Mass. CA Approx. **$1,200,000.** OFFICE addn., WORCESTER, MASS. Paul Revere Life Insurance Co., 18 Chestnut St., Worcester, Mass. Bids Mar. 13. CD 2/18.

Hayes Constr. Co., 1285 East St., New Britain, Conn., CA **$958,000,** Proj. BI-R-126, library and classroom bldg., Conn. Teachers' College, NEW BRITAIN, CONN. State P. Wks. Dpt., 165 Capitol Ave., Hartford, Conn. CD 3/5, under LB.

MacMillan Co., Inc., 28 Mechanic St., Keene, N. H., LB **$757,675,** HOSPITAL, NEW LONDON, N. H. New London Hospital Bd. Trustees, c/o Administrator, New London, N. H. Bids Mar. 20. CD 3/12.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

Pa., Phila.—PIER IMPRVS.—BA 4/8—City, Dpt. Procurement, City Hall Annex, Bids A-6039 constr. storeroom and walkaway, Bids A-6040 installing lighting facilities for storeroom and walkaway, Bids A-6041 heating system, new storeroom, Municipal Pier No. 80S, Delaware River.

† **N. Y., Brooklyn**—HARDSTAND—BA 4/9—Dist. Pub. Wks. Office, Third Naval Dist., Federal Office Bldg., 90 Church St., New York, Zone 7, hardstand, access road and utilities for GCA unit, U. S. Naval Air Station, Floyd Bennett Field, NBy 8230, Spec. 8230/56.

† **N. Y., Brooklyn**—DISASTER REPAIRS—BA 4/9—Dist. Pub. Wks. Office, Third Naval Dist., Federal Office Bldg., 90 Church St., New York, Zone 7, disaster repairs to bldgs. U. S. Naval Supply Activities NBy 8232, Spec. 8232/56.

† **D. C., Wash.**—BA 4/10—Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C., addnl. control valves in water distr. sys., Naval Security Station, NBy-11399.

Pa., Phila.—SUBWAY—STATION—BA 4/12—City, Dpt. Procurement City Hall Annex, Contr. No. 362, alterations and addns. to northeast portion of Snyder Avenue Subway Station. Plans deposit $10. CD 11/9/44.

† **N. Y., Bangor**—GAP FILLER FACILITIES—BA On Or About 4/24—U. S. Eng., 111 E. 16 St., New York, Zone 3, unmanned gap filler facilities, ENG-30-075-57-366. Plans deposit $25. CD 12/28.

BUILDINGS—BA

▲ **Pa., McDonald**—SCHOOL—BA 4/10—Fort Cherry Joint School Auth., 1 story, steel, brick, Fort Cherry Junior Senior High School, $1,000,000. Plans deposit $50, Kuhn, Newcomer & Valentour, 470 Washington Rd., Pittsburgh, Zone 25, archts. CD 12/3/54.

HEAVY CONSTRUCTION—LB & CA

Fago Brothers Contg. Co., Tonawanda, N. Y. CA **$419,606.** 1,973 ft. concrete sewer in Hager St. and Wholers Ave. between Florida and E. Ferry Sts., BUFFALO, N. Y. Buffalo Sewer Auth., City Hall, Buffalo, N. Y. Awarded Mar. 19. CD 9/18/47.

Gaines & Co., 635 Picadilly Rd., Towson, Md. LB **$78,156.** Items 1, 2, 3, 9 and 11 (17 bidders) Contr. 549 D.S.W. various sections, TOWSON, MD. County executive, Baltimore Co., County Office Bldg., Towson, Md. Bids Mar. 14. CD 2/28;
Piccirilli Constr. Co., 3114 Marecco St., Baltimore 13, Md. LB **$60,820.** (17 bidders) Items 4, 5 and 6 (Towson, Md.).

BUILDINGS—LB & CA

▲ **Hertel Homes, Inc.,** c/o J. P. Straubinger, 229 French St., Buffalo, N. Y. Owner Builds. **$2,500,000.** 156 HOUSING units on 8½ acre tract on Hertel Ave. between Elmwood Ave. and Military Rd., BUFFALO, N. Y. Backus, Crane & Love, 232 Delaware Ave., Buffalo, N. Y., archts.

John Rouse Constr. Co., 8 Church St., Gouverneur, N. Y. LB **$593,593,** (5 bidders) Central SCHOOL, HERMON, N. Y. School Bd. Educ., Town of Hermon-Dekalb-Canton and Russell, Hermon, N. Y. Bids Mar. 12. CD 2/18.

Dygert Constr. Co., 827 Rowland Ave., Syracuse, N. Y. LB **$772,000.** (9 bidders) general constr. Buckley Road Elementary SCHOOL, LIVERPOOL, N. Y. Bd. Educ., Liverpool Central School Dist., Liverpool, N. Y. Bids Mar. 14. CD 3/5.

McKay Constr. Co., 112 Farrier Ave., Oneida, N. Y. LB **$687,693.** (10 bidders) general constr. JUNIOR-SENIOR HIGH SCHOOL, NEW YORK MILLS, N. Y. Bd. Educ., New York Mills, N. Y. Bids Mar. 14. CD 3/5.

John Luther & Sons, 87 Stillson St., Rochester, N. Y. LB **$922,000.** (8 bidders) general constr. HIGH SCHOOL, PENFIELD, N. Y. Penfield Central School Dist., Penfield, N. Y. Bids Mar. 14. CD 3/1.

▲ **Evergreen Builders, Inc.,** 85 Central Ave., Clifton, N. J. Owner Builds. **$2,090,000.** 83 HOUSES, Grove St. Richfield Section to be known as Farming Ridge Development, CLIFTON, N. J. Rudolph Novak, 89 Central Ave., Clifton, N. J., archt.

A. Herman, 2 Clifton Ave., Clifton, N. J. Owner Builds. **$600,000.** 29 HOMES, Main Ave. and Fenlon Blvd. to be known as Fenlon Manor, CLIFTON, N. J.

▲ **Geo. and John Poydenecz,** 737 Broad St., Clifton, N. J. Owner Builds. **$3,500,000.** 110 HOUSES, Broad St. (Plymouth Rock Homes), CLIFTON, N. J. Rudolph Novak, 89 Central Ave., Clifton, N. J., archt.

Frank D. Trainer & Sons, 16 Smith St., Irvington, N. J. CA **$347,000.** CHURCH, ELIZABETH, N. J. Union Townley Presbyterian Church, Salem Rd. and Hugenot Ave., Elizabeth, N. J. Clement Fairweather, 39 Rector St., Metuchen, N. J., archt.

Peter Parahus, 281 Speer Ave., Clifton, N. J. Owner Builds. **$700,000.** 30 HOUSES, McClelland Ave., LIVINGSTON, N. J. H. Gerritsen, 118 Passaic Ave., Garfield, N. J., archt.

▲ **Cadillac Homes, Inc.,** Cherry Tree and Harmony Rds., Middletown, N. J. Owner Builds. **$3,000,000-$3,500,000.** 160 HOUSES, Cherry Tree and Harmony Rds., MIDDLETOWN, N. J. Wm. Chirgotis, 968 Stuyvesant Ave., Union, N. J., archt.

Roth-Buermann Co., 319 Mt. Pleasant Ave., Newark, N. J. CA **$400,000.** SYNAGOGUE, SCHOOL, 563 Broadway, PASSAIC, N. J. Aides Israel & Hillel Synagogue & Academy, 11 Tulip St., Passaic, N. J. Levy & Scheingarten, 1120 E. Jersey St., Elizabeth, N. J., archts.

Walter C. Hurley, 1928 Heck Ave., Neptune, N. J. CA **$374,382.** (5 bidders) Middle Road Elementary SCHOOL, RARITAN, N. J. Bd. Educ., Raritan Twp., Somerset Co., Raritan, N. J. Frederick Fessler, Holmdel Rd., Hazlet, N. J., archt. Awarded Mar. 14.

▲ **Cadillac Homes, Inc.,** Cherry Tree and Harmony Rds., Middletown, N. J. Owner Builds. **$5,000,000.** 250 HOUSES, Shrewsbury and River Rds., SHREWSBURY N. J. William G. Chirgotis, 968 Stuyvesant Ave., Union N. J., archt.

The Nicholson Co., 10 Rockefeller Plaza, New York 20, N. Y. CA construct and finance, eight 30x130 ft. SILOS for storage of cocoa beans, HERSHEY, PA. Hershey Chocolate Co., Hershey, Pa. CA 8/21/46.

Harry W. Corbett Co., 1752 N. Highland Rd., Pittsburgh, Pa. LB **$348,900.** 1 story, brick, block Evergreen Elementary SCHOOL, Turtle Creek, MONROEVILLE, PA. Municipal Auth. of Monroeville, Turtle Creek, Pa. Bids Feb. 27. CD 2/21.

Mellon Stuart Co., 210 E. Parkway, N.S., Pittsburgh, Pa. CA Est. **$380,000.** 4 story, bsmnt., brick, block MEDICAL BLDG., Cedar Blvd. and Florida Ave., MOUNT LEBANON, PA. Stewart Bros., 528 Washington Rd., Pittsburgh, Pa. A. E. Tennyson, 666 Washington Rd., Pittsburgh, Pa., archt.

▲ **Carcaise Constr. Co.,** 481 Virginia Ave., Rochester, Pa. CA **$1,418,198.** general constr. Secondary SCHOOL for Shenango Area Joint School District, NEW CASTLE, PA. Pub. School Bldg. Auth., 101 S. 25 St., Harrisburgh, Pa. CD 3/18, under LB.

LeDonne Constr. Co., Inc., 111 St. Clair Ave., Clairton, Pa. CA **$628,888.** 2 story, 72x445 ft., steel, L-shaped Clara Barton SCHOOL, West Mifflin, PITTSBURGH, PA. School Dist. of West Mifflin, West Mifflin, Pa. CD 2/25, under LB.

Baltimore Contractors, Inc., 711 S. Central Ave., Baltimore 2, Md. CA **$997,400.** 1 story, Arundel Elementary SCHOOL, Cherry Hill Sect., BALTIMORE, MD. City Bureau Bldg. Constr., 410 Municipal Bldg., Baltimore 2, Md. CD 3/21, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

† **Va., Quantico**—COMMUNICATION CABLE—BA 4/10—Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C., installing communication cable between Building 2101 and 2117, Marine Corps Air Station, NBy-8374. CD 8/28, under Public Buildings.

▲ **Alabama**—NATURAL GAS LINES—BA 4/11—Mobile County Gas Dist., Citronelle, 86 mi. natural gas lines to serve 11 towns in Mobile Co. $2,000,000. CD 7/2.

Ky., Louisville—BA 4/11—Metropolitan Sewer Dist., 412 W. Market St., Contr. 226B, Ohio River Interceptor Sewer Sect. B, 4,500 ft. 8 in. sewer, appurtenant

(Continued on page 121)

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	**Middle West**
Middle Atlantic	**West of Mississippi**
South	**Far West**

PROPOSED WORK

Water Supply	**Public Buildings**
Sewers, Waste Disposal	**Mass Housing**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.
CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	**Federal Government**
▲	**Project of $1,000,000 or over.**
ENR	**Engineering News-Record**
CD	**Construction Daily**

For additional reports see Construction Daily.

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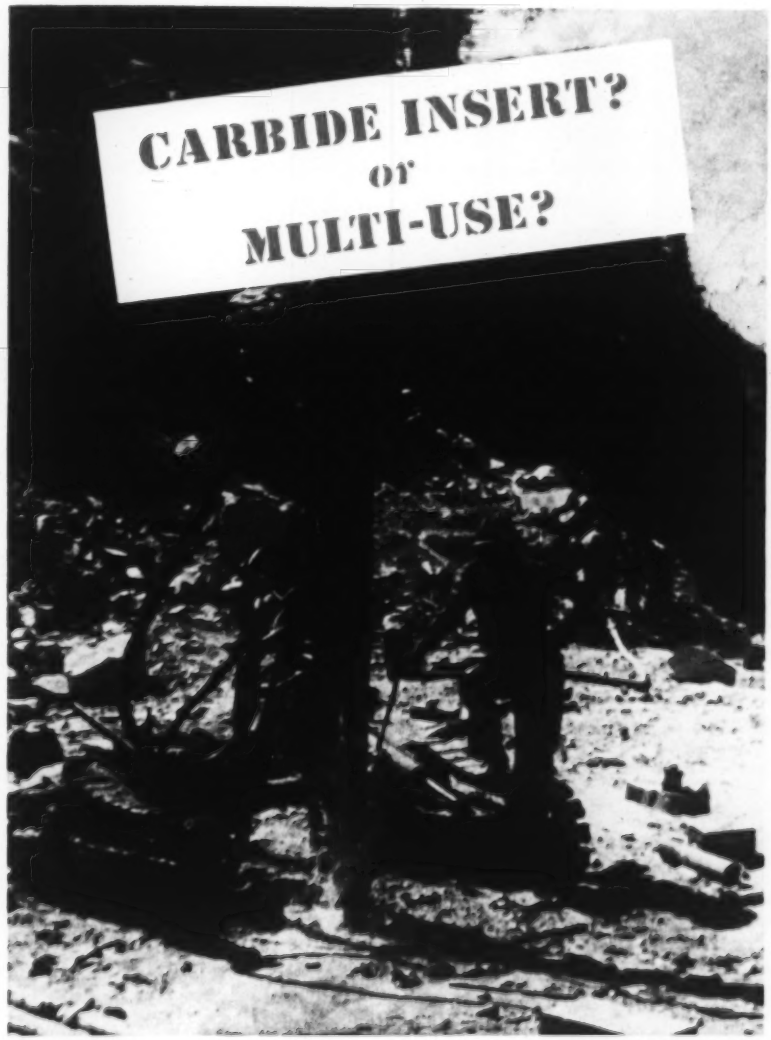

LOCATION—
Park County, Colorado

OPERATING CONDITIONS—
Granite and porphyry

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LUDINGTON MICHIGAN

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6 COMPACTING UNITS in work-head for maximum coverage

2 COMPACTING UNITS in twin hook-up self-propelling. One man readily compacts up to 4,000 sq. ft. per hour in 10" layers.

1 COMPACTING UNIT fitted with operating handle and narrow base. Just right for the otherwise unreachable spots.

3 COMPACTING UNITS in tandem and staggered. One of many hook-ups to exactly suit conditions.

4 COMPACTING UNITS just fit this widening job. Change required only a few minutes.

(Continued from page 118)

work. $500,000. Plans deposit $50 refundable. Metcalf & Eddy, 10 Statler Bldg., Boston 10, Mass., engrs. CD 3/18, under LB.

† **NORTH CAROLINA**—BA 4/16—Bureau Pub. Rds., Dpt. Commerce, Gatlinburg, Tenn.,
substructure for bridge over Conaluftee River, Blue Ridge Parkway, Proj. 2Z3.

† **Ga., Albany**—BA 4/25—Dist. Pub. Wks. Office, Sixth Naval District, Bldg. 13, U. S. Naval Base, Charleston, S. C., industrial waste disposal system, U. S. Marine Corps Supply Center, NBy-4924, Spec. 4924/56. CD 8/27, under Public Buildings.

† **Ga., Brunswick**—BUILDING REPAIRS, etc.—BA 4/25—Dist. Pub. Wks. Office, Sixth Naval District, Bldg. 13, U. S. Naval Base, Charleston, S. C., building repairs, U. S. Naval Air Station, Glynco, NBy-10288, Spec. 10288/56; drainage imprvs. and bridge construction, U. S. Naval Air Station, Glynco, NBy-10227, Spec. 10227/56. CD 8/27.

BUILDINGS—BA

† **Fla., Tampa**—STRUCTURE REPAIRS—BA 4/16—U. S. Pub. Wks. Office, Sixth Naval Dist., Bldg. 13, Charleston, N. C., miscellaneous repairs to structures, U. S. Naval Industrial Reserve Shipyard, NBy-8669, Spec. 8669/56. Extended date. CD 3/15.

HEAVY CONSTRUCTION—LB & CA

▲† **Blackwell Eng. Co.**, Box 358, Merifield, Va., CA **$1,526,858**, Proj. 1-A-2, 1-A-3, 1-A-4, piers and superstructure for 3 viaducts, Washington Memorial Parkway, Arlington Co., VIRGINIA. Bureau P. Rds., Dpt. Commerce, 1440 Columbia Pike, Arlington, Va. Bids Mar. 7. CD 3/12, under LB.

VIRGINIA—Commonwealth of Va., Dpt. Hys., Central Hy. Office Bldg., 1221 E. Broad St., Richmond,

E. V. Williams Co., Inc., 1269 E. Princess Anne Rd., Norfolk, Va. and **W. H. Scott**, Box 418, Franklin, Va., LB **$478,754** (2 bidders) Contract M1, consisting regular excav., borrow excav., subgrade tr., soil aggreg. base course, bit. material cover aggreg. c. conc., 4,440 lin. ft. conc. pipe, concrete reinforcing steel, underdrains, guard rail. Bids Mar. 20. CD 3/7.

▲ **VIRGINIA**—Commonwealth of Va., Dpt. Hys., Central Hy. Office Bldg., 1221 E. Broad St., Richmond. Bids opened 3/20.

Va.—**Kentucky-Virginia Stone Co., Inc.**, Box 137, Middlesboro, Ky., LB **$212,314** (1 bidder) macad. pen top 1.34 mi. Rt. 58, Proj. 1752-13-14, F-04-1 (5), Lee Co.;

Va.—**Atlantic Bitulithic Co., Inc.**, 1400 Roseneath Rd., Richmond, Va., LB **$168,404** (3 bidders) b. conc. 0.74 mi. Route 161 and 356, State Proj. 2043-11-10; 5143-05, S-865 (3), Henrico Co.;

Va.—**Garrett, Moon & Pool, Inc.**, Box 112, Blackstone, Va., LB **$263,189** (5 bidders) b. conc. 1.66 mi. Route 60, State Proj. 2120-08, F-040-2 (3), Chesterfield Co.;

Va.—rejected bids Mar. 20, b. conc. 0.82 mi. Route 3, Proj. 3388-14, F-012-1 (2) Spotsylvania Co.;

Va.—rejected bids, b. conc. 2.25 mi. Route 211, State Proj. 1778-02, F-01 (11), Rappahannock Co.;

Va.—cancelled bids to have been opened Mar. 20, soil aggreg. base 1.52 mi. Route 633, State Proj. 1369-16, S-994 (1), Page Co. CD 3/6.

▲ **VIRGINIA**—The Richmond-Petersburg Turnpike Auth., 1015 E. Main St., P. O. Box 1-R, Richmond, Zone 2,

Blythe Bros. Co., P. O. Box 989, Charlotte, N. C., CA **$2,727,807**. Contract F-2-G, Section F, grading, drainage, paving, structures from Sycamore St. to Bollinbrook St. in city of Petersburg. Bids Feb. 26. CD 3/1, under LB.

WEST VIRGINIA—State Road Comn., Charleston, Zone 5. Bids opened 3/19.

Thomas M. Nunnally, Erwin Lane, Fairmont, W. Va., LB **$108,842**. Coney Island Bridge No. 2025, Proj. F-190 (7), McDowell Co. CD 3/12.

▲ **WEST VIRGINIA**—State Road Comn., Charleston. Bids opened 3/19.

W. Va.—**Charleston Constr. Co.**, Station B, Box 164, Charleston, W. Va., LB **$298,095**. c. conc. 2.338 mi. Proj. F-312 (6), Cabell Co.;

W. Va.—**W. A. Wilson & Sons Constr. Co.**, St. Mary's, W. Va., LB **$569,169**. traffic bound base course, b. conc. base, bottom and wearing course 2.327 mi. Proj. S-657 (1), Hancock Co.;

W. Va.—**Feather Constr. Corp.**, Morgantown, W. Va., LB **$503,194**. traffic bound base course, b. conc bottom and wearing courses 5.275 mi. Proj. S-655 (2), Hardy Co.;

W. Va.—**Bennie Snyder**, Box 816, White Sulphur Springs, W. Va., LB **$517,884**, traffic bound base and b. conc. base, bottom and wearing courses 2.352 mi. Proj. F-117 (6), Randolph Co. CD 3/12.

Willis L. Wilson, 1829 Spring Valley Dr., Huntington, W. Va., LB **$111,145**. sewage treatment plant, MADISON, W. VA. Town, Town Hall, Madison, Wis. Bids Mar. 12.

Brown & Wright, Princeton, W. Va., LB **$302,000**. imprv. Mercer County Airport, PRINCETON, W. VA. Mercer County Court, Princeton, W. Va. Bids Mar. 12. CD 2/26.

▲† **Ruscon Constr. Co.**, 149 E. Bay St., Charleston, S. C., LB **$1,216,369**, HOSPITAL, Myrtle Air Force Base, ENG-38-081-57-25, MYRTLE BEACH, S. C. U. S. Eng., Custom House, Charleston, S. C. Bids Mar. 20. CD 2/13.

† **Louis Briggs Constr. Co.**, 4425 Pio Nono Ave., Macon, CA **$924,449**. two barracks and mess hall addn., U. S. Naval Air Station, Glynco, NBy 4950, Spec. 4950/56, BRUNSWICK, GA. Dist. P. Wks. Office, Bldg. No. 13, U. S. Naval Base, Charleston, S. C. Bids Mar. 14. CD 3/19, under LB.

† **FLORIDA**—State Road Dpt., Tallahassee,

Belcher Oil Co., Box 227, South Miami 43, Fla., CA **$864,556**, (5 bidders), limerock base with b. conc. and binder, 120 ft. bridge, 9.573 mi. SR 710, Job 9331-102, Palm Beach Co. Bids Mar. 7, awarded Mar. 19. CD 3/13.

▲† **Hardaway Contg. Co. & The Jordan Co.**, P. O. Box 1360, Columbus, Ga., CA **$5,585,322**. buildings and utilities, Canaveral Harbor Facilities, Patrick Air Force Base, ENG-08-123-57-26, COCOA, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. CD 8/23.

Intercounty Constr. Corp., 2224 N.E. 12th, Fort Lauderdale, CA **$50,677**, WW imprvs., Proj. 1, HOLLYWOOD, FLA. City, City Comn., City Hall, Hollywood, Fla. Bids Feb. 26, awarded Mar. 12. CD 2/20.

† **Pub. Wks. Officer**, Bldg. 13, U. S. Naval Base, Charleston, S. C. cancelled bids to have been opened Mar. 21, A. U. W. Shop at Boca Chica Field, NOy 91077, KEY WEST, FLA. CD 2/14.

▲† **TENNESSEE**—Bureau P. Rds., Dpt. Comerce, Gatlinburg,

Harrison Constr. Co., Maryville, Tenn., LB **$1,203,913**. Proj. 15 A3, grading, draining, tunnel, bridge, culverts and road work, Foothills Parkway, Sevier Co. Bids Mar. 21. CD 2/20.

† **Mather Constr. Co.**, Clarksville, Ind. CA **$755,554**. supporting facilities, incl. roads, culverts, sanitary sewers, water lines, gas lines, electrical distr. systems for Capehart Housing, ENG-15-029-57-24, FORT KNOX, KY. U. S. Eng., 830 W. Broadway, Louisville, Ky. CD 2/19, under LB.

BUILDINGS—LB & CA

▲ **Ray M. Lee**, 1004 Edgewood Ave. NE, Atlanta, Ga., LB Item 1, **$3,307,900**, Item 2, **$3,593,660**, Item 3, **$3,010,000**, HOSPITAL, LAKELAND, FLA., City, c/o Purchasing Agent, City Hall, Lakeland, Fla. CD 2/20.

Allison & Holland Co., Inc., Box 543, Baton Rouge, La. CA **$654,500**. 3 story, 60,000 sq. ft. concrete block south stadium men's DORMITORY Louisiana State University, BATON ROUGE, LA. State Bldg. Auth., State Capitol, Baton Rouge, La. Awarded Mar. 18. CD 3/20, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—LB & CA

Vest & Bartell, 1953 Losantville St., Cincinnati, O., LB **$284,666** (4 bidders) widening Liberty St. from Sycamore to Vine St., CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Mar. 19. CD 3/8.

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Broadmeadow elementary school, Needham, Massachusetts. Architects: Hugh Stubbins Associates, Lexington, Mass.; Vara Construction Co. of Boston was general contractor.

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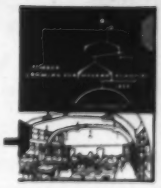

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▲ **Charles A. Shook Constr. Co.**, 582 W. 2 St., Dayton, O., CA $3,036,316, sewage treatment plant, HAMILTON, O. City, City Hall, Hamilton, O. Bids Feb. 28, awarded Mar. 18. CD 3/7, under LB.

▲ **E. A. Harrold**, Wayne, Mich., LB $360,000 Section 3, Div. II, intercepting sewers; LB $803,935, Sect. 1, 2, 3 together, Div. II intercepting sewers; LB $1,029,923, Sects. 1, 2, 3, 4, 5, 6, together Div. II, intercepting sewers, NEW CASTLE, IND. Bd. P. Wks. & Safety, City Hall, New Castle, Ind. Bids Mar. 14. CD 2/21;
E. R. Knapp & Sons, Rochester, Ind., LB $121,942 Sec. No. 1, Div. II, intercepting sewers; (New Castle, Ind.);
W. H. Joyner & Sons, Inc., 501 New York Ave., New Castle, Ind., LB $272,448, Sect. 2, Div. II intercepting sewers (New Castle, Ind.);
Hernly Bros., Parker, Ind., LB $244,000. Sect. 4 and 5, Div. II, intercepting sewers (New Castle, Ind.);
Buesching Bros. Constr. Co., 219½ E. Berry St., Fort Wayne, Ind. LB $454,914 Base Bid, Div. I, sewage treatment plant, (New Castle, Ind.).

▲ **ILLINOIS**—Illinois State Hy. Comn., 20 N. Wacker Dr., Chicago,
Standard Paving Co., 30 N. LaSalle St., Chicago, Ill., and **Peter J. Crowley Co.**, Box 144, Maywood, Ill., LB $4,783,624, Contr. T-2-C, grading, drainage, paving, appurtenances, precast concrete bridges 2.45 mi. S. of 11 St. extending northerly to S. of 95 St., Cook Co. Bids Mar. 21. CD 3/4.

▲ **ILLINOIS**—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,
ISTHC—**Allied Structural Steel Co.**, 20 N. Wacker Dr., Chicago, Ill., LB $1,213,763, Contr. SN-8, furnishing, fabricating, erecting structural steel for Bridge N-8-10 at intersection of Tri-State Route and Southwest Rte. between O'Hare Field and Chicago city limits;
ISTHC—**Mississippi Valley Structural Steel Co.**, 111 W. Washington Blvd., Chicago, Ill., LB $762,247. Contr. ST 6, furnishing, fabricating, erecting structural steel for Bridge T-6-5 at intersection of Tri-State Route and East-West Route, Elmhurst. Bids Mar. 14. CD 3/4.

▲ **ILLINOIS**—State Dpt. P. Wks. & Bldg., Div. Hys. Centennial Bldg., Springfield,
rejected bids Mar. 1, base course widen., 5.4 mi. c. conc. 6.24 mi. Mt. Carmel, east, Wabash and Lawrence Counties, LB $1,289,223. CD 3/7, under LB.

Pascal P. Paddock, Inc., 612 W. 5 St., Tulsa, Okla., CA $73,000, est. $100,000 swimming pool, bathhouse and utility bldg., BEARDSTOWN, ILL. Beardstown Community Park Dist., W. W. McKnight, pres., 113 State St., Beardstown, Ill. Bids Jan. 3. CD 12/18.

M. **Hoffken Co. & Hoffken Bros. Inc.**, 222 West B St., Belleville, Ill., LB $559,769 (3 bidders) imprv. Sect. 169-MFT, S. A. Rte. 42 and 42 Extension near here, adjacent to intersection 70 St. and W. Main St., northeasterly with 13,651.96 ft. imprv. with conc. BELLEVILLE, ILL. Bd. Supervs. St. Clair Co., Court House, Belleville, Ill. Bids Mar. 11. CD 2/27.

† **Wright Constr. Co.**, P. O. Box 5271, Lansing 5, Mich. CA $381,780. channel imprvs. on Kalamazoo River between 20 Street Bridge in Battle Creek, downstream to point just below Fort Custer waterworks bridge at Battle Creek, MICHIGAN. U. S. Eng., 600 E. Jefferson Ave., Detroit, Mich. CD 1/4.

BUILDINGS—LB & CA

▲ **Blaw-Knox Co., Chemicals Plant Div.**, 930 Fort Duquesne Blvd., Pittsburgh, Pa., CA Est. $5,000,000. specialty organic chemical mfg. PLANT, 240-acre site, incl. processing bldg., office-warehouse and steam generating plant, HENRY, ILL. B. F. Goodrich Chemicals Co., 3135 Euclid Ave., Cleveland 15, O.

F. H. **Martin Constr. Co.**, 955 E. Jefferson St., Detroit, Mich. CA $600,000. three 1 story bldgs., ADMINISTRATION BLDG., EXECUTIVE GARAGE and RESEARCH AND DEVELOPMENT STRUCTURE, ALLEN PARK, MICH. Wolverine Tube Div. of Calumet-Hecla, Inc., 1411 Central St., Detroit, Mich. Marr & Marr, 415 Brainerd St., Detroit, Mich., archts.

▲ **Seth E. Giem & Assocs.**, Kalamazoo, Mich. CA $1,140,200. HOSPITAL, JACKSON, MICH. Mercy Hospital, Charles G. Donahue, pres., Advisory Bd., Jackson, Mich. Bids Mar. 12. CD 3/4.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

Minn., Center City—BA 4/10—Chisago Co., P. A. Berquist, aud., subgrade corrections, grav. base, road-mixed bit. surf. bit. seal coat 2.9 mi. between T. H. 61 in Harris and CAR 21, S. P. 13-505-01 (SAR 1) Minn. Proj. S 6365 (1); 0.8 mi. between west line of Chisago Co. and Rush City, S. P. 13-507-03 (SAR 7) Minn. Proj. S 6375 (2); 4.1 mi. between the west line of Chisago Co. and Stark, S. P. 13-603-01 (SAR 1) Minn. Proj. S 6365 (2). Plans deposit $1.10, $90,000. J. Schmit, co. hy. engr.

† **Minn., Duluth**—WATER TANK—BA About 4/18—U. S. Eng., 1217 Post Office & Custom House, St. Paul, elevated steel water tank at Duluth Air Force Base, ENG-21-018-57-11. CD 8/23.

† **Tex., Delmita**—BA 4/26—U. S. Eng., Laredo Resident Office, Galveston Dist., CE P. O. Box 1395, Laredo, constr. unmanned gap filler facility, ENG-41-243-57-34. Delmita Air Force Station. $75,000. Extended date. CD 3/18.

BUILDINGS—BA

▲ **Tex., El Paso**—COUNTY—BA 4/23—El Paso Co., Courthouse, remodel county bldg. $1,500,000. Monroe, Licht & Higgins, 827 E. Yandell Blvd., archts.

Ark., Fayetteville—APARTMENT HOUSE—BA 4/16—Bd. Trustees, University of Arkansas, T. C. Carlson, secy.-treas., Fayetteville, apartment house for married students. $900,000. Plans deposit $50. CD 3/14.

† **Kan., Great Bend**—TRAINING CENTER—BA 4/16—U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo., 1 story 11,600 sq. ft. Army Reserve Training Center, Spec. 57-75. $200,000-$250,000. CD 3/13.

▲ **Mont., Warm Springs**—BA 4/25—State Bd. Examiners, Helena, 1 story receiving and intensive treatment bldg. at State Mental Hospital. $1,500,000. CD 5/7, under LB.

BUILDINGS—SLC

Ark., Pine Bluff — WAREHOUSE — Staples Realty Co., Charleston, Mo., soon lets contract warehouse to contain 28,000 sq. ft. floor space, concrete tilt-up slab walls, to be erected on tract bounded by 4th and 5th Aves., and Bois d'Arc and Peach Sts. $100,000-$150,000. Sears, Roebuck & Co., Chicago, Ill., and 303 Main St., Pine Bluff, lessee. CD 3/20.

HEAVY CONSTRUCTION—LB & CA

† **Lakehead Constructors, Inc.**, 201 Telegram Bldg., Superior, Wis. LB $128,600. (12 bidders) constr. apron replacement at Leech Lake Dam, Cass Co., Federal Dam, MINNESOTA. U. S. Eng., 1217 Post office and Custom House, St. Paul, Minn. Bids Mar. 20. CD 2/18.

J. J. **Nagel**, Perham, Minn. LB $74,051. (13 bidders) county road projs. bridge No. 7179 and grading of approaches, ADA, MINN. Norman Co., A. Elleraas, aud., Ada, Minn. Bids Mar. 18. CD 3/1.

Phelps-Drake Co., 1415 S.E. Eighth St., Minneapolis, Minn. LB $211,091 (6 bidders) constr. water main and sanitary sewer imprvs. Nos. 1957-1, 2, 15, 11, 4, 5, 12 and 14, BROOKLYN CENTER (P. O. MINNEAPOLIS), MINN. Village, H. R. Jones, clk., Brooklyn Center, Minn. Bids Mar. 19. CD 3/7.

Lametti & Son, 211 N. Pascal St., St. Paul, Minn. LB $98,321. (7 bidders) constr. Storm Sewer Imprvs. Nos. 1957-9 and 1956-58, BROOKLYN CENTER (P. O. MINNEAPOLIS), MINN. Village, H. R. Jones, clk., Brooklyn Center, Minn. Bids Mar. 19. CD 3/7.

C. L. **Nelson & Son**, Brainerd, Minn. LB $96,247. (5 bidders) grade, sand-grav. subbase, grav. base, road-mixed bit. base road-mixed bit. surf. 7.9 mi., CROOKSTON, MINN. Polk Co., M. L. Vanseth, aud., Crookston, Minn. Bids Mar. 19. CD 3/1.

(Continued on page 124)

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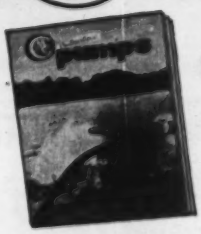

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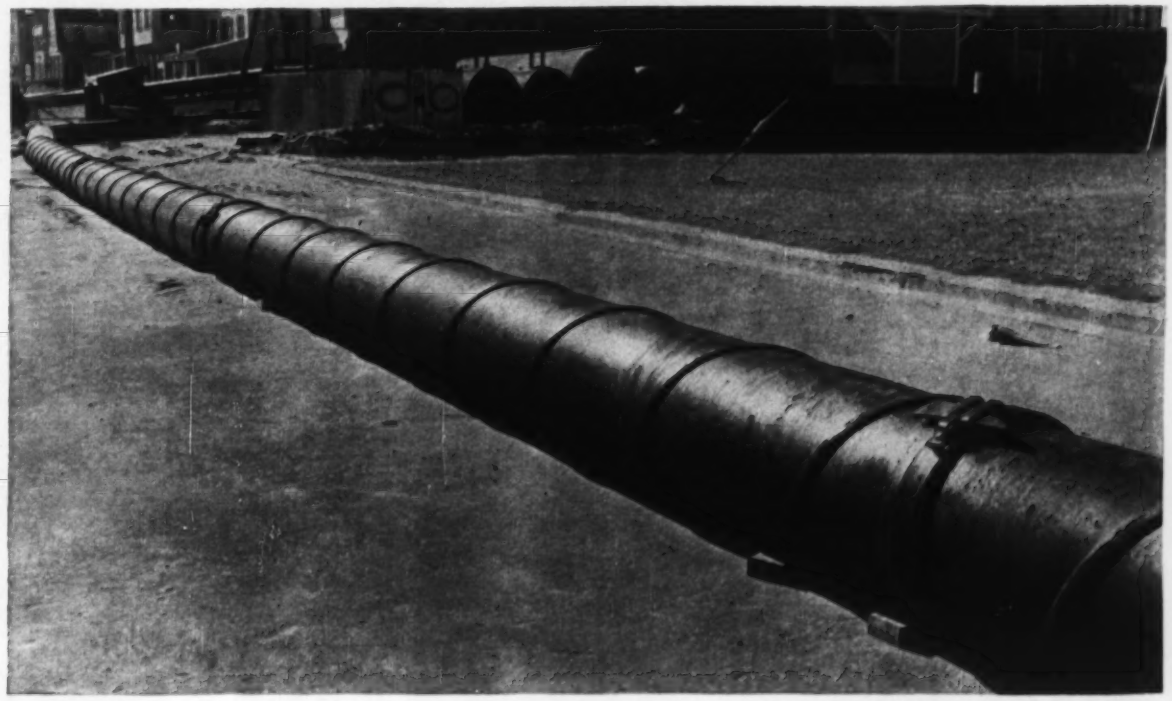

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(Continued from page 122)

J. Brown Constr. Co., Mankato, Minn. LB **$152,710.** (9 bidders) constr. county road projs. sand grav. subbase, grav. base, road-mixed bit. surf. 2 mi. & mi. and 4 mi., ST. JAMES, MINN. Watonwan Co., D. J. Bottom, aud., St. James, Minn. Bids Mar. 19. CD 3/1.

Spencer Constr. Co., Spencer, Iowa, CA **$207,842.** sewage plant imprvs., WASHINGTON, IOWA. City Washington, Iowa. Bids Mar. 4. CD 2/26.

MISSOURI—State Hy. Dpt., Jefferson City,

Arthur E. Quinn, Contr., Salisbury, Mo. CA **$81,074.** graded earth, bridge grav. or crushed stone surf. 9.2 mi., Rte. S&B, Proj. S 1538 (1), Johnson Co. Bids Feb. 15, awarded Feb. 21. CD 1/29.

† **Thomas Constr. Co.**, Scheneider Bldg., St. Joseph, Mo LB **$633,757**, est. $646,890, basic, **$623,880** alt. est. $637,810. two 3 story, concrete, frame dormitories, Grandview Air Force Base, ENG-57-62, GRANDVIEW, MO. U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo. Bids Mar. 20. CD 2/28.

Midwest Pre-Cote Co., 7600 E. 17 St., Kansas City, Mo. LB **$146,071.** (1 bidder) sewers, pump station for District bounded by Blue Ridge on East Blue Ridge cutoff on west and lying south of US 40, INDEPENDENCE, MO. City, Independence, Mo. Bids Mar. 18.

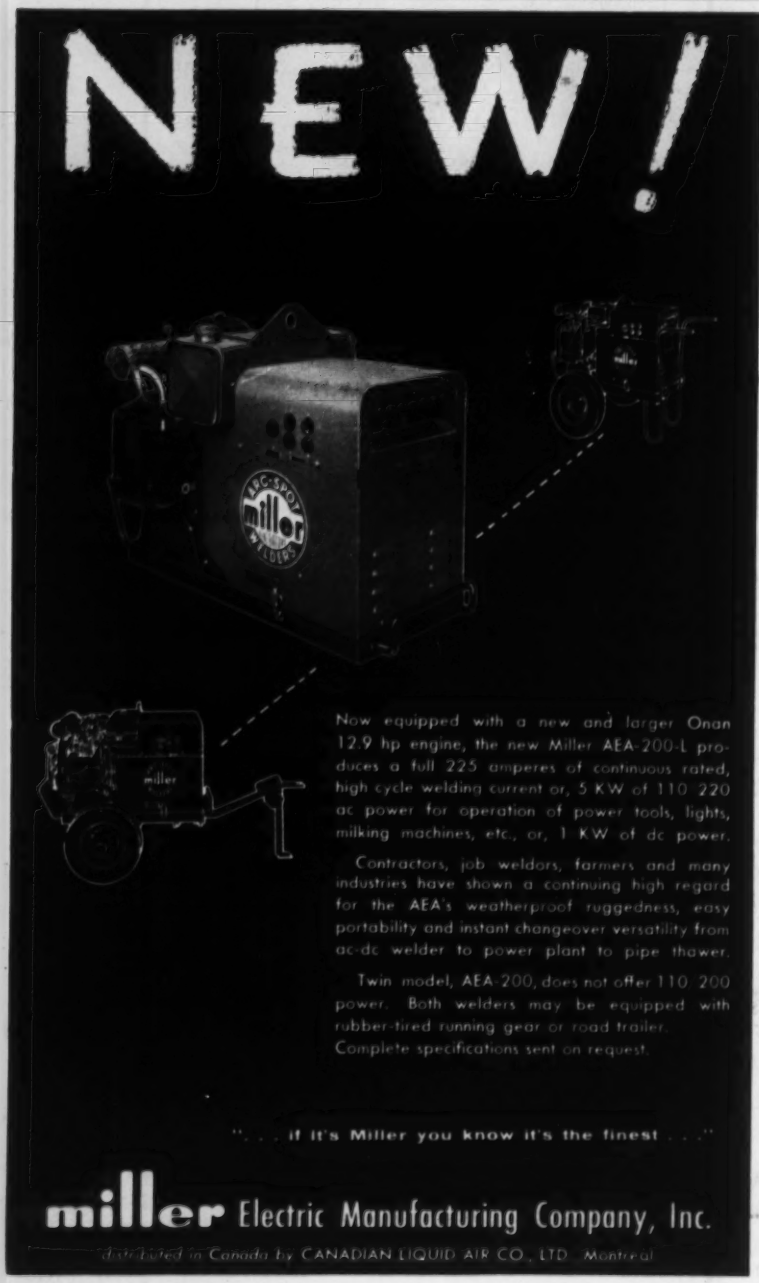
Torson Constr. Co., 1890 Woodswether Rd., Kansas City, Mo. LB **$396,318.** (7 bidders) constr. large water main, from new Waldo pumping station at 75 and Holmes Sts. south on Holmes to 95 Sts., KANSAS CITY, MO. City, City Hall, Kansas City, Mo. Bids Mar. 19. CD 1/30/56.

Albers Constr. Co., 5701 Chippewa St., St. Louis 9, Mo. LB **$206,833.** (3 bidders) constr. series of moats and pools, landscaping adjacent to new elephant house in Forest Park, ST. LOUIS, MO. City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12 Blvd. and Market Sts., St. Louis 3, Mo. Bids Mar. 19. CD 2/20.

Lehman Lippert, 4412 N. W. 39 St., Oklahoma City, Okla. CA **$79,000.** 2 m.g. surface concrete reservoir, EDMOND, OKLA. City, City Hall, Edmond, Okla. Bids Mar. 15, awarded Mar. 18. CD 3/5.

Curtiss & Deason Constr. Co., 2321 N. E. 26 St., Oklahoma City, Okla., CA **$243,910.** Section A, water mains, OKLAHOMA CITY, OKLA. City, City Hall, Oklahoma City, Okla. Bids Feb. 19. CD 2/18, under LB.

TEXAS—Texas Hy. Comm., Austin,
cancelled bids to have been opened Mar. 19, 2.16 mi. gra., strs., concrete pavt. and hot mix A. C. P. on hy, US 81 Proj. I. 264 (12) Bexar Co.; grading, structures, flex. base and b. conc. 0.509 mi. hy. FM 770, Proj. R. 1096-1 & Hardin Co.; grading, structures, base and surfacing 4.993 mi. hy. FM 51 Project R 313-10-3, Hood Co. CD 3/5.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▲ **TEXAS**—State Hy. Comm., Austin. Bids opened 3/19,

Tex.—Dean Skinner, P. O. Box 4057, Austin, Tex., LB **$573,389.** grade separations and bridges 0.214 mi. on hy. US 77 Proj. I. 487 (13) Ellis Co.;

Tex.—John T. Leslie, Bailey, Tex., LB **$184,911.** structures on hy. St., 0.142 mi. 78 & 121 Proj. C. 280-1-11 & C. 549-1 & 2-3 & 3, Fannin Co.;

Tex.—Luther A. Turner, Box 542, Buda, Tex., LB **$215,964.** Onion Creek Bridge and approaches 1.284 mi. on Hwy. St. 71 Proj. F. 302 (12) Travis Co.;

Tex.—Dean Skinner, P. O. Box 4057, Austin, Tex., LB **$193,409.** Coleto Creek Bridge. 0.151 mi. Hy. US 59 Proj. F. 551 (12), Victoria Co. CD 2/26.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 3/19,

Tex.—M. E. Ruby, Brown Bldg., Austin, **D. B. Denny, Jr. & H. & H. Constr. Co.**, San Marcos, Tex., LB **$285,419.** 23.202 mi. grad., strs. bs and surf. on Hy. FM 140 and US 281 on Project R. 748-5-4, C.73-5&6-17-14, Atascosa Co.;

Tex.—W. L. Barnes & John T. Leslie, 5607 Adams St., Austin, Tex., LB **$630,406.** 18.781 mi. grading, structures, base and surfacing on Hy. RM 1919, Project S 2125 (1), Baylor Co.;

Tex.—McMillin-Burkett Constr. Co., P. O. Box 1161, Texarkana, Tex., LB **$208,265.** 10.957 mi. grading, extending streets, stabilize base and one course surface treatment on Hy. US 82 Proj. C 46, 3&4, 9 and 19, Bowie Co.;

Tex.—G. C. McBride Co., P. O. Box 500, Brownwood, Tex., LB **$122,491.** 22.520 mi. b. conc. HY. US 67 and 84, FM 45, 2126, 53, and 42. Brown Coleman and McCulloch Counties;

Tex.—Gaylord Constr. Co., P. O. Box 6154, Houston, Tex., LB **$116,287.** 24.69 mi. hot mix b. conc. Hy. SH 71 Project C. 700-1, 2 & 3-6, 3&9, Burnet, Blanco and Travis Counties;

Tex.—H. V. Caver, Inc., Atlanta, Tex., LB **$79,935.** 7.238 mi. flex. base and one crs. surf. treat. shoulders on Hy. US 59, Project F 457 (5), Cass Co.;

Tex.—O. W. Howard & J. C. McLaughlin, Madisonville, Tex., LB **$438,259.** 5.023 mi. grading and structures on Hy. SH 73, Proj. I 1052 (40), Chambers Co.;

Tex.—R. W. McKinney, P. O. Box 190, Nacogdoches, Tex., LB **$295,884.** 4.469 mi. gra., extend strs., flex base and A. C. P. on Hy. SH 289, Proj. S 51 (2), Collin Co.;

Tex.—Bryan & Hoffman, P. O. Box 390, Plainview, Tex. LB **$671,345.** 17.198 mi. gra., strs. fl. bs. and ora and two crs. surf. treat on Hy. U.S. 84, loop 46 and FM 1269 Proj. F 635 (6), Garza Co.;

Tex.—Kerr & Middleton, P. O. Box 5665, Lubbock, Tex., LB **$82,499.** 1.219 mi. grad., flex. base and 3 course surf. treatment on Hy. FM 37 and US 60, Proj. C 52 8 5, C 168 L&2, Lamb and Parker Counties;

Tex.—Lange & Lowman Constr. Co., P. O. Box 506, Brenham, Tex., LB **$201,363.** 2.400 mi. gra. strs. fl. bs. and b. conc. Hy. US 81, Proj. F 548 (12), La Salle Co.;

Tex.—J. O. Boswell, 311 Paris Ave., Lubbock, Tex., LB **$407,072.** 8.494 mi. gra., strs., flex. base and hot mix b. conc. Hy. US 84, Proj. F 502 (15), Lubbock Co.;

Tex.—E. E. Hood & Sons, Box 6097, San Antonio, Tex., LB **$132,779.** 11.302 mi. reconditioned flex. base and two crs. surf. treat Hy. US 377 Proj. C. 149-4-7, Mason Co.;

Tex.—Heidenfels Bros., P. O. Box 1917 Corpus Christi, Tex., LB **$1,043,379.** 0.719 mi. grad., strs. flex. base and b. conc. Hy, US 181, Proj. U. 204 (10), Nueces Co.;

Tex.—R. N. Adams, P. O. Box 581, Kaufman, Tex., LB **$615,128.** 7.717 mi. gra., strs. fl. bs & hot mix b. conc. Hy. US 180, Proj. F 132 (10), Parker Co.;

Tex.—J. M. Dellinger, Inc., P. O. Box 4227, Corpus Christi, Tex., **$139,378.** 11.72 mi. grading shoulders and shoulder surfacing on Hy. US 77 Proj. C. 371-2&3-20&25, Refugio Co.;

Tex.—Angelo Constr. Co., P. O. Drawer 1631, San Angeleo, Tex., LB **$287,912.** 222.521 mi. seal coat on Hys. US 80, 285, SH 17, 51, 349, 158, 302, Spur 194, FM 1211, 11, 1053, 866, 1219, 1601, 1450, 1901 and 2401, Reeves, Ector and Midland Counties;

Tex.—Uvalde Constr. Co., P. O. Box 10286, Dallas, Tex., LB **$440,242.** 2.111 mi. grad. strs., con. base and hot b. conc. pavt. on Hy. US 287, Proj. C 172-1-15, Tarrant Co.;

Tex.—R. B. Smith, Inc., 3702 Glen Haven St., Houston, Tex., LB **$151,226.** 109.978 mi. seal coat and level up on Hys. US 271, FM 71, 1519, 144, 899, 1000, 1735, 993, 1520, 1521, 1734, and 2152, Titus, Camp Morris, and Upshur Counties;

Tex.—Perry Constr. Co. & J. W. Perry, 501 Insurance Bldg., San Antonio, Tex., LB **$507,274.** 8.054 mi. gra., strs., flex., base and b. conc. Hy. SH 71 Proj. F. 779 (3), Wharton Co. CD 3/5.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 3/20,

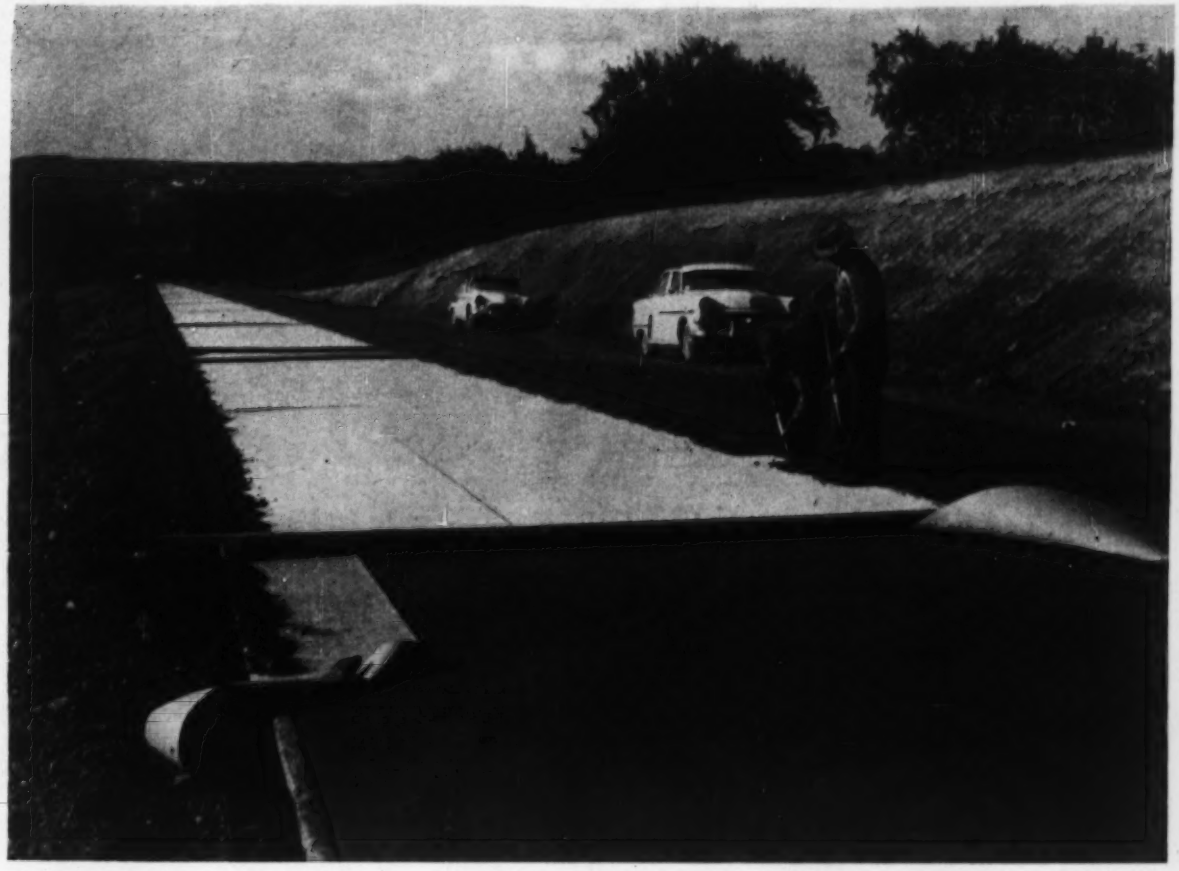
Tex.—Thomas J. Evans, Jr., & M. M. Pettyjohn, P. O. Box 478, So. Houston, Tex., LB **$988,997.** Colorado River Bridge and approaches 0.589 mi. City of Bastrop Control No. 265-4 & 5-16 & 24, Fed. Proj. F283(3) Bastrop Co.;

Tex.—Anchor-Wate Co., Almeda, Tex., LB **$156,074.** Big & Little Chocolate Bayou Bridges and approaches 0.848 mi. southwest of Port Lavaca on State Highway 35, Proj. F. 753(3) Calhoun Co.;

Tex.—J. C. McLaughlin, P. O. Box 1149, Bryan, Tex. LB **$78,920.** widening bridges and approaches 1.048 mi. from north of Ore City to New Diana, Proj. C 392-2-18, Upshur Co. CD 3/1.

TEXAS—State Hy. Comn., Austin,
Callan Constr. Co. & Cooper Woodruff, Inc., P. O. Box 3146, Waco, Tex., CA **$693,717.** grading, structures, flex. base, one course surf. tr. 17.288 mi. Hy. SH 16,

(Continued on page 126)



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(Continued from page 124)

Proj. S-751 (3), Mills Co. Bids Jan. 23. CD 1/28, under LB.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 3/20,

Tex.—**A. L. Sheppard**, P. O. Box 1871, Vernon, Tex., LB $81,525, seal coat 78.753 mi. Hys. US 277, FM 210, 922 1198, 1199, 1201, 1200, 1202, 1306, 455, 370, 1207, and 1763. Proj. 44-9-2. Cooke, Archer, Bay'or, Montague, Wichita and Wilbarger Counties;

Tex.—**Cage Bros. & T. C. Cage**, 6959 San Pedro St., San Antonio, Tex., LB $1,027,118. flex. base and hot mix. b. con. 10.287 mi. on Hy. US 80 Proj. I. 235(28) Howard Co.; LB $1,636,893. flex. base and hot mix b. con. 2.804 mi. Hy. US 81 Proj. I. 8 (15) Hays Co.; base and surfacing 10.463 mi. Hy. FM 1885 & FM 52 Proj. R. 539-4-7, R. 539-5-1, R. 649-2-7, R. 649-2-6; Palo Pinto and Parker Counties;

Tex.—**Gulf Bitulithic Co.**, P. O. Box 2572, Houston, Tex., LB $74,891. flex base, and b. con. 0.480 mi. Hy. US 90 A Proj. C. 446 38, Colorado Co.; LB $73,580, grading, structures base and surfacing 6.487 mi. Hy. FM 943, Proj. R. 1194-1-4, Polk Co.;

Tex.—**Holland Page**, P. O. Box 1181, Austin, Tex., LB $710,818. flex. base, and one crs. surf. treat. 18.874 mi. Hy. US 283 Proj. F. 668(3) Coleman Co.;

Tex.—**Austin Road Co.**, P. O. Box 1590, Dallas, Tex., LB $2,580,746. concrete asphalt pavt., and 2 crossings, surf. treat 13.504 mi. Hy. US 75 Proj. F 98 (10) FG 98 (11) & U. 515 (24) Collins and Dallas Counties;

Tex.—**George Kies & R. B. Bowden**, 1303 Robert E. Lee Rd., Austin, Tex., LB $249,726 seal coat 267,634 mi. Hys. US 90-A, 59, 87, FM 653, 609, 154, 234, 240, 77, 108, 153, 443, 795, 682, 446, 447, 238, 234, 622, 530, 953, 1291, 647, 1164, 1292, 1680, 1579, 1586, 1679, 1682 st. 316 & PRII, Colorado, Wharton and Gonzales Counties;

Tex.—**Collins Constr. Co. of Texas**, P. O. Box 1192, Austin, Tex. LB $108,094. flex. base and two crossings, surf. treat. 3.898 mi. Hy. SH 16, Proj. C. 288-3-5, Eastland Co.;

Tex.—**McElroy Transport Co.**, 3513 E. Belknap St., Fort Worth, Tex. LB $142,071. c. conc. 55.528 mi. Hys. U. S. 277, SH 127, RM 336, and 187; Edwards, Uvalde and Real Counties;

Tex.—**Bryan & Hoffman**, P. O. Box 390, Plainview, Tex. LB $91,485. grading, structures, base and surfacing 7.993 mi. Hy. FM 2063, Proj. R. 2181-1-1, Hale Co.;

Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex. LB $99,881. grading, structures, base and surfacing 2.072 mi. Hy. FM 418, Proj. 200-12-2, Hardin Co.;

Tex.—**Southwestern Contg. Co.**, 1219 Cotton Exchange Blvd., Dallas, Tex. LB $210,467. grading, structures, base and surfacing 11.453 mi. Hy. FM 1244 and Spur Proj. R. 209-6-6, R. 209-7-4, and R209-10-1, Hill and McLennan Counties;

Tex.—**Schwope Bros. & C. H. Allison Constr. Co.**, 6633 W. Commerce St., San Antonio, Tex. LB $171,642. seal coat 124.408 mi Hys. SH 11, 154, FM 697, 898, 36, 275, 137, 410, 1563, 897, 904, 1532, 1528, 1533, and 1699 R Proj. C 83-1-8, Hunt, Hopkins and Grayson Counties;

Tex.—**R. W. McKinney**, P. O. Box 190, Nacogdoches, Tex. LB $1,198,235. flex. base on concrete 6.840 mi. Hy. U. S. 80 Proj. I. 526 (14) and I 130 (11), Kaufman Co.;

Tex.—**Austin-Worth Constr. Co.**, P.O. Box 531, Fort Worth, Tex. LB $197,399. flex. base shoulders and b. conc. 12.537 mi. Hy. U. S. 82, Proj. C 45-8 and 9-15 and 25, Lamar Co.;

Tex.—**W. H. Moser Constr. Co.**, 150-10 N. E., Paris, Tex. LB $203,319. grading, structures, base and surf. 7.821 Hy. FM 2352, Proj. 2194-1-1, Lamar Co.;

Tex.—**F. C. Herrling**, Kurten, Tex. LB $148,342. grading, structures, base and surf. 3.394 mi. Hy. FM 1600, Proj. R. 1519-1-3, Milam Co.;

Tex.—**Heidenfels Bros.**, P. O. Box 1917, Corpus Christi, Tex. LB $636,681. grading, base and b. conc. 2.243 mi. on Hy. SH 9 and U. S. 77, Proj. F. 657 (16), Nueces and San Patricio Counties;

Tex.—**Texas Bitulithic Co.**, P. O. Box 10365, Dallas, Tex. LB $97,680. flex. base, b. conc. 0.267 mi. Hy. SH 183, Proj. C. 94 5 12, Tarrant Co.;

Tex.—**Ray Boswell**, Pampa, Tex. LB $339,464. b. conc. 2.637 mi. Hy. U. S. 62, Proj. F. 1104 (5) and S. 676 (2), Terry Co.;

Tex.—**Gilson & Latson Constr. Co.**, 5923 Burnet Rd., Austin, Tex., LB $138,198. hot mix. b. con. 23.402 mi. Hy. US 81, 290 & 79 Proj. C. 15-3-21, C. 114-1 & 2-14 & 19 C. 114-5 & 6-12 & 10 & C. 204-3-13, Travis, Bastrop and Williamson Counties;

Tex.—**South Texas Constr. Co.**, P. O. Box 3536, Corpus Christi, Tex., LB $435,580. flex. base and b. conc. 8.701 mi. Hy. US 59 Proj. F. 551 (11) Victoria Co.;

Tex.—**A. L. Sheppard & Ferrier Bros.**, P. O. Box 1871, Vernon, Tex. LB $153,651. base and surfacing 11.308 mi. Hy. FM 592 Proj. R 761-5-1, Wheeler Co.;

Tex.—**Border Constr. Co. & Rose C. Watkins**, Laredo, Tex. LB $159,363. base and surfacing 7.367 mi. Hy. FM 496, Proj. S. 1132 (3) Zapata Co. CD 3/1.

▲ **Kieffer Plumbing & Heating Co.**, 6411 Harry Hines Blvd., Dallas, Tex., CA $1,276,100; mechanical contract for maintenance base at Love Field, DALLAS, TEX. City (Braniff Airways, Lessee) City Hall, Dallas, Tex., Bids Feb. 18, CD 3/4, under LB;

Byrne Doors, 1603 East Nine-Mile Rd., Ferndale Mich., CA $277,135. hangar doors (Dallas, Tex.)

† **Burnett Constr. Co.**, Box 336, Corpus Christi, Tex., CA $914,380, subsistence bldg., Naval Auxiliary Air Station, NBy-6334, Spec. No., 6334/56 KINGSVILLE, TEX. Officer in Charge of Constr. Naval Air Advanced Training Command, Naval Air Station, Corpus Christi, Tex., Bids Mar. 12, CD 3/1.

Ed. Nills Constr. Co., 4501 Telephone Rd., Houston 32, Tex., LB $189,678, est. $190,000; sewage treatment plant, sewage lines, McNAIR, TEX. Harris Co. Fresh Water Supply Dist. 1A, c/o Rob. W. Kelly, Rte. 1, Box 114, Baker Rd., Baytown, Tex. CD 3/15.

▲† **Lawless & Alford, Inc.**, Box 600, Austin 63, Tex., CA $3,084,000, constr. ACADEMIC BLDG. AND FLIGHT LABORATORY AND UTILITIES, Brooks Field, ENG-41-243-57-15, SAN ANTONIO, TEX. U. S. Eng., Box 1229, Galveston, Tex. CD 3/13, under LB.

▲ **Hansen & Parr and J. Crick & Sons**, W 315 Boone St., Spokane, Wash. CA Est. $1,100,000. 2 overpasses on Hy. 10-A in conjunction with Noxon Rapids hydro project, Noxon, MONTANA. Washington Water Power Co., W 825 Trent St., Spokane, Wash.

† **American Ligurian Co., Inc.**, 37 Wall St., New York, N. Y., LB $96,162, one 4,500-kva, vertical-shaft generator for Big Thompson power plant, Spec. DS 4836, COLORADO, Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. Bids Mar. 14, CD 1/15.

BUILDINGS—LB & CA

D'Arcy Lock Constr. Co., 2838 Stevens Ave., Minneapolis, Minn. CA Total cost $180,000, general constr. 1 story, 150x202 ft. WAREHOUSE addn., MINNEAPOLIS, MINN. Minneapolis Brewing Co., 1215 N.E. Marshall St., Minneapolis, Minn. Bids Mar. 18. CD 3/13.

C. Ralle Contg. Co., 500 Kemper Ave., St. Louis 9, Mo. CA Est. $350,000-$400,000, 40-unit Johnson Motor LODGE, incl. swimming pool on north side of Lindbergh Blvd. adjacent to Union Rd., ST. LOUIS COUNTY, MO. C. A. Krater, 6340 Devonshire Ave., St. Louis 9, Mo. CD 10/10/56, under CA.

Kingery Constr. Co., 1941 Y St., Lincoln, Neb. CA $917,203, general constr. JUNIOR HIGH SCHOOL, LINCOLN, NEB. Bd. Educ., 720 S. 22 St., Lincoln, Neb. Bids Feb. 28, awarded Mar. 12. CD 3/20, under LB.

▲ **C. G. Puryear**, Box 1133, Austin, Tex., LB $473,400. Bid A water chilling station addn., AUSTIN, TEX. University of Texas, c/o Bd. Regents, 104 Main Bldg., Austin, Tex. Broad & Nelson, 505 N Ervay St., Dallas, Tex., archts. Zumwalt & Vinther, 929 Merc. Sec. Bldg., and Frank W. Chappell, Burt Bldg., Dallas, Tex., engrs. Bids Mar. 12, CD 4/29/53;

Todd-Ford, Ltd., 447 W. Hildebrand St., San Antonio, Tex., LB $659,535. Bids B. air-conditioning main university bldg. (Austin, Tex.)

▲ **Brown & Root, Inc.**, Box 3, Houston, Tex., CA $2,000,000, PLANT to produce acetylene from natural gas, near DEER PARK, TEX. Diamond Alkali Co., Deer Park, Tex. Scientific Design Co., Inc., 2 Park Ave., New York, N. Y., engr. CD 10/12.

J. M. Hollis Constr. Co., Box 583, Pasadena, Tex., CA $370,588, 8 room HIGH SCHOOL addn. and new ELEMENTARY SCHOOL, HOUSTON, TEX. Sheldon Independent School Dist., Mascadine St., or c/o M. J. Fields, supt., 12914 Ticonderoga St., Houston, Tex. Bids Feb. 28. CD 2/25.

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▲ **Howle Co.**, Box 387, Wichita Falls, Tex. LB **$1,171,000**, 46,000 sq. ft. masonry CHURCH, WICHITA FALLS, TEX. First Christian Church, Wichita Falls, Tex. CD 2/18.

FAR WEST

HEAVY CONSTRUCTION—LB & CA

Calif., Los Angeles—BA 4/12—Los Angeles Co. Flood Control Dist., 2250 Alcazar St., Storm Drain Bond Issue Proj. No. 76, Unit 2, 212th St. Storm Drain. $412,300. Plans deposit $3.64. CD 11/7/52.

▲ **Calif., Los Angeles**—BA 4/12—Metropolitan Water Dist. of Southern Calif., 303 W. 3rd St., constr. 60,000 ft. 49 in. diam. pipe feeder pipe line for Colorado River Aqueduct, Culver City. $4,000,000.

▲ **Utah, Layton**—BA 4/12—North Davis County Sewer Dist., Ray J. Dawson, res., Layton, sewerage treatment plant in Syracuse. $1,000,000. Temple & Linke, 500 Dooly Bldg., Salt Lake City, engrs. CD 11/19.

† **Oregon**—BA 4/16—U. S. Eng., Pittock Block, Portland, clearing Area 9A, 156 acres Cougar Reservoir on East Fork, Lane Co., CIVENG-35-026-57-192. CD 7/16.

Calif., Los Angeles—BA 4/19—Los Angeles Co. Flood Control Dist., 2250 Alcazar St., rein.-con. conduit, Bradbury Channel from Lemon Ave. to Mt. Olive Dr., Duarte. $500,000. Plans deposit $3.64. CD 11/7/52.

† **Arizona, California and Nevada**—BA 5/7—Bureau Reclamation, Dpt. Interior, Boulder City, Nev., protective surfacing for Hoover Power Plant and valve house roofs, Boulder Canyon Proj., Spec. DC 4880. CD 9/21/44.

† **California**—BA 5/8—Bureau Reclamation, Dpt. Interior, Winters, Calif., Solano Project, DC 4881, Putah South Canal, Station 1017 plus 00 to Station 1476 plus 24.52, near Fairfield, Solano Co. CD 4/14/54.

▲† **Oregon**—BA 5/21—U. S. Eng., Pittock Block, Portland, constr. dam and outlet works, power intake works and detour road and bridges, Hills Creek Reservoir, Middle Fork Willamette River, Lane Co., CIVENG-35-026-57-175, $15,000,000. CD 11/18/55.

BUILDINGS—BA

Calif., Los Angeles—SCHOOL—BA 4/17—University of California, 405 S. Hilgard Ave., elementary school, on UCLA Campus, $600,000. Plans deposit $125. CD 4/25.

BUILDINGS—SLC

▲ **Calif., Sunnyvale** — DEPARTMENT STORE — Harts' Dept. Store, Market and Santa Clara Sts., San Jose, soon lets contract 3 story, 63,000 sq. ft. Branch Dept. Store. $2,000,000. John S. Bolles, Pier 5, San Francisco, archt. CD 2/26.

HEAVY CONSTRUCTION—LB & CA

† **Cache Valley Electric Co.**, Logan, Utah, LB **$129,800**, est. $120,000-$160,000 (8 bidders) underground electric distr. sys., Veterants Admin. Center, BOISE, IDAHO. Veterans Admin. Munitions Bldg., Wash., D. C. Bids Mar. 19. CD 1/30.

UTAH—State Road Comn., State Capitol, Salt Lake City, rejected bids Feb. 19, road mix bit. surf. 21.175 mi. F. A. Proj. A-AA 47 (1), San Juan Co. LB **$783,796**. CD 2/27, under LB.

NEVADA—Directors Dpt. Hys., State Office Bldg., Carson City,

Dodge Constr., Inc., Fallon, Nev. CA **$592,603**. (9 bidders) constr. portion of State Hy. System from Nye-Lincoln Co. line to 25 mi. southeast on State Rte. 25, Rte. Sect. FAS 802, Control Sections LI-12 and LI-13, Proj. S 802 (3), State Hy. Contr. No. 986, Lincoln Co. Bids Mar. 14. CD 3/1.

▲ **General Constr. Co.**, 3840 Iowa St., Seattle, Wash., CA **$1,967,180**, est. $1,631,902. Shilshole Bay breakwater, Seattle, Inv. 57-46, WASHINGTON. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Mar. 12. CD 3/15, under LB.

▲† **P. McInnis, Henry George & Sons**, Hutton Bldg., Spokane and **Bumstead & Woolford**, 1411 4th Ave. Bldg., Seattle, Wash., CA **$1,065,913**, steam plant addn. Fairchild Air Force Base, Inc. 57-98, SPOKANE, WASH. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Mar. 12. CD 3/15, under LB.

L. W. Vail Co., Pasco, Wash., LB **$108,983** (10 bidders) streets imprvs., ONTARIO, ORE. City, City Hall, Ontario, Ore. Edwin K. Burton, c/o owner, engr.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento, Bids opened 3/20.

Calif.—Fredericksen & Kasler, 212 13th St., Sacramento, Calif., LB **$2,718,100** (5 bidders) grading, paving 3.9 mi. U. S. 99 with concrete on cement treated subgrade and constr. 9 bridges and 3 pumping plants between 0.5 mi. south and 1.5 mi. north of Madera, Madera Co.;

Calif.—**Granite Constr. Co.**, P. O. Box 900, Watsonville, Calif., LB **$1,039,020** (5 bidders) constr. 5.6 mi. four lane divided freeway between one mi. north of Greenfield and Sailinas River on U. S. 101 and const. rein.-con. girder overcrossing of Arroyo and Seco Rd., Monterey Co., CD 2/26.

▲† **M. H. Golden**, 3485 Noel St., San Diego, Calif., LB **$1,058,000** (4 bidders) constr. Bachelor OFFICERS QUARTERS, Naval Amphibious Base, CORONADO, CALIF. Eleventh Naval Dist., Commandant, 937 Harbor Dr., San Diego, Calif. Bids Mar. 20, CD 8/28.

Granite Constr. Co., Watsonville, Calif., CA **$78,023** (2 bidders) various city streets imprvs. DEL REY OAKS, CALIF. City, c/o Clerk, City Hall, Del Rey Oaks, Calif. Clyde C. Kennedy, 604 Mission St., San Francisco, Calif. engr.

▲† **Connolly-Pacific Co. & T. E. Connolly**, 1925 Water St., Long Beach, LB **$3,877,711** (5 bidders) subsidence remedial measures, Naval Shipyard, NBy 4182, Spec. 4182/56, LONG BEACH, CALIF. Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids Feb. 26. CD 3/5, under LB.

▲ **Los Angeles Coliseum Comn.**, 3911 S. Figueroa St., Los Angeles, Calif., rejected bids Jan. 8, sports arena, LOS ANGELES, CALIF. LB **$9,186,000**. CD 1/11, under LB.

† **U. S. Eng.**, 751 S. Figueroa St., Los Angeles, Calif., rejected bids to have been opened Mar. 21, access aprons, Base Maintenance Hangar No. 2, Edwards Air Force Base, ENG-04-353-57-73, MUROC, CALIF. **$500,000**. CD 3/4.

William H. Schallock, 217 Daniels Lane, Bakersfield, Calif., CA **$117,800**, swimming pool, OILDALE, CALIF. North-of-the-River Pub. Recreation Dist., Oildale, Calif. Stuhr & Hicks, 924 Truxtun Ave., Bakersfield, Calif., archts. Bids Mar. 6, awarded Mar. 12.

BUILDINGS—LB & CA

▲ **The Oakland Constr. Co.**, and **Ryberg & Garff Constr. Co.**, 850 W. 15 St. N., Salt Lake City, Utah, CA **$5,300,000**. MEN's DORMITORIES, PROVO, UTAH Latter Day Saints Church, 47 E. S. Temple St., Salt Lake City, Utah. Bids Feb. 28. CD 3/19, under LB.

H. Halvorson Inc., E 5218 Sharp Ave., Spokane, Wash., CA **$628,407**. 3 story, 115x125 ft., rein.-con. NURSES HOME, SPOKANE, WASH. Deaconess Hospital, W 733 4 St., Spokane, Wash. CD 2/6, under LB.

▲ **Young Men's Christian Assn.**, Yakima, Wash., rejected bids Dec. 13, 4 story CLUB, YAKIMA, WASH. LB **$1,251,671**.

C. W. Devore, P. O. Box 37, Garden Grove, Calif., CA **$521,962**; WALTER KNOTT ELEMENTARY SCHOOL, incl. 20 classrooms, Buena Park, ANAHEIM, CALIF. Centralia School Dist., 7341 Lincoln Blvd., Anaheim, Calif. Bids Mar. 8, awarded Mar. 10. CD 3/21, under LB.

Jay Bailey Constr. Co., P. O. Box 148, Woodland, Calif., LB **$557,752** (5 bidders) combined bid MEADOW LANE and ANDERSON HEIGHTS ELEMENTARY SCHOOL addns., ANDERSON, CALIF. Cascade Union Elementary School Dist., c/o Supt., Anderson, Calif. Donald Beach Kirby, 109 Stevenson St., San Francisco, Calif., archt. CD 2/27/56.

Summerland Land Co., 1124 S. Beverly Blvd., Los Angeles, Calif., Owner Builds. **$570,100**. 1,200 sq. ft., 53 stucco DWELLINGS, Tract 2353, COSTA MESA, CALIF.

Moss Bldg. Corp., 227 S. Robertson Blvd., Beverly Hills, Calif. Owner Builds. **$900,000**. 1,118 sq. ft. 69 DWELLINGS, West Aves. H-4, H-3, H-2 and H-1, King and Lancaster Sts., LANCASTER, CALIF. Curtis Chambers, 28 S. Fair Oaks St., Pasadena, Calif., archt. CD 1/8.

▲ **Hillcrest Rentals**, 6701 S. Main St., Los Angeles, Calif., Owner Builds, **$1,048,200**; MULTIPLE HOUSING

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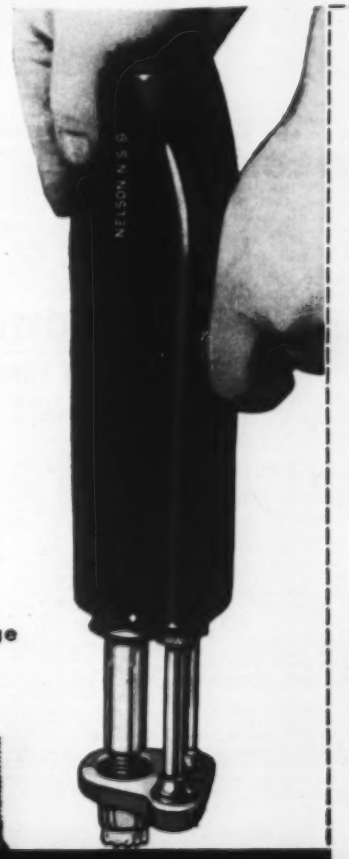

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▲ **Barrett Constr. Co.**, 1800 Evans Ave., San Francisco, Calif., LB Est. **$1,500,000.** constr. MUSHROOM PLANT incl. living quarters, PESCADERO, CALIF. Campbell Soup Co., 100 Market St., Camden, N. J. CD 3/7.

Wopschall Constr. Co., 35 N. Arroyo Parkway, Pasadena, Calif. CA **$507,995**, est. $460,000; 1 story, frame, stucco, LOS ROBLES SCHOOL, PUENTE, CALIF. Hudson School Dist., 15839 E. Rowland St. Bids Mar. 8. CD 3/15, under LB.

United Constr. Co., 3839 Riverside Blvd., Sacramento, Calif., LB **$703,500**; (8 bidders) const. H. W. HARKNESS ELEMENTARY SCHOOL, 6770 Hogan Dr., and John Bidwell ELEMENTARY SCHOOL, 1730 65th Ave., SACRAMENTO, CALIF. Sacrament Unified School Dist., 1619 N. St., Sacramento, Calif.

▲ **O. E. Anderson**, 1075 N. 10th St., San Jose, Calif., CA **$1,024,490**. general work, CA **$498,553**, mechanical work, CA **$237,896**; electrical work, CA **$114,192**, elevators, Proposal B, Grand total $1,875,131. 4 story, type I, rein.-con. HOSPITAL addn., SAN JOSE, CALIF. San Jose Community Hospital, 14th and E Sts., San Jose, Calif. CD 2/8, under LB.

Van-Bokkelen Cole Co., 955 N. Grand Ave., Oakland, Calif., CA **$225,000**. WAREHOUSE and parking area, 135 Ave. and Tea Garden St., SAN LEANDRO, CALIF. John A. Graciano, c/o Theodore R. Maist, archt., 355 Grand Ave., Oakland, Calif. Dpt. Educ., State of California, lessee.

Harold Geyer, P. O. Box 1190, Monterey, Calif., CA **$465,000**. DIAL CENTRAL OFFICE BLDG., Broadway between Pacific and Noche Buena Aves., SEASIDE, CALIF. Pacific Telephone & Telegraph Co., c/o Dist. Mgr., Monterey, Calif.

William Simpson Constr. Co., 2401 Beverly St., Los Angeles, Calif., CA **$900,000**. 80,000 sq. ft. WHOLESALE DRUG DISTRIBUTION CENTER, SOUTH SAN FRANCISCO, CALIF. Coffin-Redington, 301 Folsom St., San Francisco, Calif. CD 1/9, under LB.

Hight Constr. Co., 4344 Eagle Rock Blvd., Los Angeles, Calif., LB **$265,865** (9 bidders) 1 story general contract LAUNDRY, 26,700 sq. ft., 2nd floor, 4,400 sq. ft. and 2,000 sq. ft. concrete loading docks at Pacific State Hospital, SPADRA, CALIF. State Div. Architecture, 1100 S. Grand Ave., Los Angeles, Calif. CD 2/20;

Kenneth Fraser Co., 707 S. Arroyo Parkway, Pasadena, Calif., LB **$271,400** (4 bidders) mechanical work (Spadra, Calif.).

Harrod & Williams, 290 S. Murphy Ave., Sunnyvale, Calif., LB **$642,824**, (11 bidders) one story, with bsmnt., under 1 wing, 25,000 sq. ft., 1st floor and 6,000 sq. ft. bsmnt., pre-cast concrete CITY HALL, SUNNYVALE, CALIF. City, City Clerk, City Hall, Sunnyvale, Calif., Milton T. Pflueger, 580 Market St., San Francisco, Calif., archt. CD 3/11.

▲ **Lincoln Development Co.**, 3190 Old Tunnel Rd., Lafayette, Calif., Owner Builds, **$2,500,000.** 200 HOME, SUB-DIVISION, west of McKinley School, TRACEY, CALIF.

Butte Steel & Constr. Co., P. O. Box 1053, Chico, Calif., CA **$185,000**; 140x440 ft. GRAIN STORAGE BLDG., WEST SACRAMENTO, CALIF. Rio Bonito Farms, c/o contractor.

Kemp Bros., 8750 Mettler St., Los Angeles 3, Calif., CA **$568,000.** 2 story 86x194 ft. concrete, stone veneer STUDENT UNION and CAMPUS INN, WHITTIER, CALIF. Whittier College, Whittier, Calif. Bids Feb. 6. CD 2/19, under LB.

CANADA

HEAVY CONSTRUCTION—BA

Quebec—ELECTRICAL SYSTEM—BA 4/24—St. Lawrence Seaway Auth., No. 2 Temporary Bldg., Ottawa, Ont., supplying, installing electrical system at Cote Ste. Catherine Lock, Lachine Section St. Lawrence Seaway, A. G. Murphy, c/o owner, 685 Cathcart St., Montreal, ch. engr.

BUILDINGS—SLC

Ont., Kitchener—ADMINISTRATION—Waterloo College, Dearborn Ave. W., Waterloo, soon lets contract. 1 story administration bldg. addn. Jenkins & Wright, 233 Queen St. S., archts.

HEAVY CONSTRUCTION—LB & CA

NORTHWEST TERRITORIES—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.,

McNamara Constr. Co. Ltd., 42 Industrial St., Leaside, Toronto, Ont., LB **$695,172**, grading, culverts Mile 0 to Mile 20, Yellowknife to Fort Rae Highway.

Donovan Constr. Co. of Canada Ltd., 78 Queen Elizabeth Blvd., Toronto, LB **$273,948**. supplying, installing electrical system at Iroquois Lock, International Rapids Section for the St. Lawrence Seaway near Iroquois, ONTARIO. St. Lawrence Seaway Auth., No. 2 Temporary Bldg., Ottawa, Ont. Bids Mar. 19. CD 2/13.

Lortie & Roussin, Inc., 85 Blvd. Ste. Anne, Giffard, Que., CA **$120,000**. installing 16 and 18 in. water mains, GIFFARD, QUE. Town, Town Hall, Giffard, Que. Awarded Mar. 15. CD 6/15.

BUILDINGS—LB & CA

▲ **G. A. Baert Constr. Co. Ltd.**, 314 Dawson Rd., Winnipeg, Man., CA Est. **$10,000,000**. 5 story, bsmnt., 320,000 sq. ft. OFFCE, WINNIPEG, MAN. Great West Life Assurance Co., Lombard St., Winnipeg, Man. Bids Mar. 12, awarded Mar. 15. CD 2/15.

▲ **Community Enterprises Ltd.**, 5665 Pare St., Montreal, Que., CA Est. About **$2,000,000.** 191 Class I and II, D.N.D. HOUSING UNITS, related services at Married Quarters area, Canadian Army Camp, FREDERICTON, N. B. Defence Constr. Co. Ltd., 56 Lyon St., Ottawa, Ont. Bids Jan. 15, awarded Mar. 15. CD 1/2.

▲ **Douglas Bremner Constr. Ltd.**, 5965 Monkland Ave., Montreal, Que. CA Est. **$1,500,000.** 86,000 sq. ft. PLANT EXPANSION, BROCKVILLE, ONT. Automatic Electric Sales (Canada) Ltd., 100 Strowger Blvd., Brockville, Ont. Bids Mar. 14. CD 3/6.

▲ **Bennett-Pratt Ltd.**, 5 Maple Leaf Dr., Weston, Ont., CA W. A. Porter Memorial Collegiate HIGH SCHOOL, TORONTO, ONT. Scarborough Bd. Educ., 1650 Kingston Rd., Toronto, Ont. Bids Dec. 17, awarded Mar. 18. CD 1/2/28, under LB.

▲ **College Park Development, Inc.**, 590 Crevier St., St. Laurent, Montreal, Que. Owner Builds. **$1,237,500**, forty-five 31x41 ft. concrete, brick DUPLEXES in housing program Hartenstein St., St. Laurent, MONTREAL, QUE. Charles Grenier, 3600 Barclay Ave., Montreal, Que., archt.

Mercantile Constr. Co. Ltd., 1449 St. Alexander St., Montreal, Que., CA Est. **$175,000.** 1 story, 140x224 ft., concrete, structural steel, frame masonry PLANT and OFFICE, St. John's Rd., POINTE CLAIRE, QUE. Gar Investment Co. and Royal Electric Co., c/o J. Z. Gauthier, archt., 2915 Soissons Ave., Montreal, Que.

Wilfred Legare, Inc. & Assocs., 915 Ste. Foye Rd., Ste. Foye, Que., CA Est. **$750,000.** HOUSING development between St. Louis Rd. and CNR tracks, STE. FOYE, QUE. Development St. Louis De France; c/o Eugene Chalifour, Inc., 2485 St. Louis Rd., Sillery, Que. Awarded Mar. 18.

ALASKA

HEAVY CONSTRUCTION—BA

† **Alaska**—BA 4/18—U. S. Eng., Anchorage, dredging 3 harbors in southeastern Alaska, at Craig, Elfin Cove and Pelican Harbor, Inv. 57-5. $900,000.

HEAVY CONSTRUCTION—LB & CA

▲† **Peter Kiewit Sons Co.**, 1300 Aloha St., Seattle, Wash., LB **$11,953,069**, est. $13,150,575, Nike installations at Eielson Air Force Base, Inv. 57-29, ALASKA. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Mar. 20.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲† **Labrador, Goose Bay**—BUILDINGS—BA 4/30—U. S. Eng., Eastern Ocean Dist., 346 Broadway, New York 13, N. Y., air force buildings and utilities, incl. Sch. A, dormitory complex; Sch. B, open mess, dental clinic, dependents school, commissary store, Goose Air Force Base, Goose Bay, ENG-30-347-57-20. Extended date. CD 3/13.

BUILDINGS—BA

▲† **England, London**—EMBASSY OFFICE—BA 6/7—American Embassy, attention Regional Foreign Bldg. Office, London, England, American Embassy Office Bldg. CD 2/28.

HEAVY CONSTRUCTION—LB & CA

▲† **U. S. Eng.**, Eastern Ocean Dist., 346 Broadway, New York 13, N. Y., U. S. A., cancelled bids to have been opened Apr. 15, housing, Ernest Harmon Air Force Base, STEPHENVILLE, NEWFOUNDLAND. CD 3/18.

BUILDINGS—LB & CA

Koppers International, C. A., Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa., U.S.A. CA design, construct and operation of styrene monomer PLANT, RAVENNA, ITALY, ANIC, Milano, Italy.

PROPOSED PROJECTS

WATER SUPPLY

Calif., Fort Bragg—City, c/o Mayor, City Hall, bond election May 28, water system imprvs. $750,000. McCandless & Jett, P. O. Box 845, Menlo Park, consult. engrs.

▲ **Calif., Newport Beach**—City, City Hall, reservoir, water system, connecting lines, **$3,448,000.** James M. Montgomery, 353 E. Walnut St., Pasadena, Calif., consult. engr. CD 2/12/47.

▲ **Ill., Elmhurst**—Elmhurst-Villa Park-Lombard Water Comn., 315 Lawndale St., Elmhurst, new water facilities, incl. main extending to Lake Michigan, Elmhurst, Villa Park and Lombard, **$13,000,000.** DeLeuw Cather & Co., 150 N. Wacker Dr., Chicago, consult. engrs.

▲ **Ill., Palatine**—Des Plaines, Arlington Heights, Mt. Prospect & Palatine Water Comn., 49 Benton St., Palatine, water facilities, incl. main extending to Lake Michigan, DesPlaines, Arlington Heights, Mt. Prospect and Palatine. **$11,000,000.** Consoer, Townsend & Assoc., 360 E. Grand Ave., Chicago, consult. engrs.

▲ **O., Cincinnati**—City, City Hall, water mains for Main St. and Central Parkway, **$924,000**; water mains Beechmont Ave. to 8-Mile Road, **$800,000.** Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 5/19/54.

▲ **Wash., Bellingham**—City, City Hall, water distr. sys. exten. **$2,000,000.** J. W. Cunningham & Assocs., Portland Trust Bldg., Portland, Ore., consult. engrs. Bids shortly. CD 3/21/55.

SEWERS, WASTE DISPOSAL

Ala., Auburn—City, City Hall, sewage disposal plant. $800,000.

Del., Laurel—City, City Hall, sewage treatment plant and interceptors, **$500,000.** Gardner & Sterling, Salisbury, Md., consult. engrs.

Del., Lewes—City, City Hall, sewerage treatment plant, **$500,000.** Gardner & Sterling, Salisbury, Md., consult. engrs.

Idaho, Lewiston—City, City Hall, sewage treatment plant, **$600,000.** Stevens & Thompson, Spalding Bldg., Portland, Ore., consult. engrs. R. Kerns, city engr. CD 3/11.

Ill., Belvidere—City, City Hall, sewers and sewage treatment plant addn. **$700,000.** Robert Anderson, 16 E. Main St., St. Charles, consult. engr.

▲ **Ind., Richmond**—City, City Hall, approx. 6 square miles sewerage sys. for area west and south of city, **$1,500,000.** CD 8/19/55.

▲ **Mich., Sault Ste Marie**—City, Ralph E. Speer, mgr., sewage plant, treatment and disposal facilities, **$2,125,000.** Drury, Porter & Seeley, 306 State Savings Bank Bldg., Ann Arbor, consult. engrs. CD 11/21/44.

▲ **Minn., New Hope**—Village, M. Honsey, mayor, sanitary trunk sewer for northeast section, connecting with Golden Valley sewerage sys. **$1,000,000.** G. M. Orr Eng. Co., 1104 Currie Ave., Minneapolis, consult. engrs. Constr. in 1957.

▲ **Minn., Red Wing**—City, H. E. Nordholm, clk., sewage treatment plant, interceptor sewerage sys., etc. **$2,000,000.** R. J. Ellison, 2066 Bayard Ave., St. Paul, consult. engrs.

▲ **N. Y., Rochester**—Monroe Co. Sewer Agency, Court House, constr. Gates-Chili-Ogden County Sewer Dist. **$7,800,000.** Wm. S. Lozier Co., 10 Gibbs St., Zone 4, engr. CD 3/15.

Ore., West Slope—West Slope Sanitary Dist., 3105 S.W. 89 Ave., defeated bonds Mar. 12, 28 mi. sewerage sys. and disposal plant, **$750,000.** Stevens & Thompson, 2235 S.W. 5 Ave., Portland, Ore., consult. engrs. CD 3/1.

Wash., Hoquiam—City, City Hall, intercepting sewers, lagoon sewage treatment facility and outfall sewer. **$615,480.**

▲ **Wash., Ronald**—Ronald Sewer Dist., Richmond Highlands, Ronald, voted **$4,700,000** bonds Mar. 12, sewerage sys. Hill & Ingman, 1728 E. Madison St., Seattle, consult. engrs. CD 11/14.

STREETS AND ROADS

▲ **CONNECTICUT**—State Hy. Dpt., 165 Capitol Ave., Hartford,

Fairfield Co.—resurf. Route U. S. 1, Darien and Stamford, **$300,000.**

rebuilding Route 123 from Parade Hill Rd. to Canoe Hill Rd., New Canaan, **$500,000.**

elocation of Route 7, Norwalk and Wilton, **$2,000,000.**

rebuilding Route 107 from end of existing construction to Route 58, Redding, **$160,000.**

repaving Route 35 and 102 from N. Y. State Line to ½ mi. east of Route 33, Ridgefield, **$150,000.**

repaving Route 57 from Goodhill Rd. to Kettle Creek Rd., Weston, **$100,000.** CD 4/14/52. Work in 1957.

▲ **IDAHO**—Bureau P. Rds., Dpt. Commerce, Morgan Bldg., Portland, Ore.

Blaine Co.—grading, surf. 10 mi. and constr. bridge on Ketchum-Clayton Hy. north of Ketchum, **$700,000.**

Bonner Co.—grading, surf. 4.6 mi. Clark Fork Hy. east of Penton, **$900,000.** Bids in July.

Idaho Co.—grading 8.51 mi. and constr. bridge on Warren Wagon Rd. near Payette Lake, **$400,000.** Bids in September. CD 6/4/54.

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,

Cayuga Co.—reconstr. Auburn-Wyckoff State Hy. between traffic circle and the hamlet of Wyckoff, hy. to be relocated on west side of Lehigh Valley R. R. at Wyckoff and re-enter the traffic circle at Sand Beach Rd. intersection, 5.6 mi., FAI Proj. **$1,000,000.**

Chemung Co.—constr. 0.8 mi. Rte. 14 as four long divided hy., complete reconstr. 0.9 mi. Rte. 328 with 48 ft. undivided pavement plus 8 ft. parking lanes, extending from structure which separates the grades of Pennsylvania R. R. and Rte. 14 northerly on Rte. 14 to Bulkhead Jct. and then northeast on Rte. 328, to Elmira City Line, FAI Proj., **$750,000.**

Niagara Co.—reconstr. approx. 0.8 mi. Center St. in village of Lewiston between Lower River Rd. and east village line, 0.7 mi. of Lewiston-Dickersonville Rd. between Lewiston and Blairsville Creek Rd., FAI Proj., **$300,000.**

Ulster Co.—reconstr. approx. 0.6 mi. Touring Rte. 32 between Kingston and Saugerties, FAI Proj., **$108,000.**

NEW YORK—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,

Schuyler Co.—wid'n., strengthening, resurf. approx. 3¼ mi. Rte. 224 beginning about 1¼ mi. east of Odessa and extending southeast to Alpine Junction then continuing for 1½ mi. on Rte. 13 from Alpine Junction easterly to Tompkins Co. Line, FAI Proj. **$500,000.**

▲ **New York**—President Richmond Boro, Boro Hall, St. George, S. I., PR-84, West Shore Expressway Section between Victory Blvd. and Archer Kill Rd., **$4,000,000.** Howard, Needles, Tammen & Bergendoff, 99 Church St., New York, Zone 7, consult. engrs. To go ahead in 1957. CD 1/26/44.

▲ **O., Cincinnati**—Bd. Comrs. Hamilton Co., Court House, four-lane divided highway from Ridge to Kenwood Rds. **$1,980,000**; four-lane divided hy. from Galbraith

(Continued on page 130)

Workmen (left) adjust follower rings before inserting bolts on a 30-inch Style 38 Dresser Coupling. It's the air line leading to the main settling tank in Miami's Virginia Key Sewage Disposal Plant. Steel and cast iron pipe meet in a Style 62 Dresser Reducing Coupling on aeration tank air line (above).

Quick-change Act for Miami Disposal Plant

Steel pipe and Dresser Couplings provide easy access, system flexibility

Dismantling for maintenance looks and is easy with a Dresser Style 38 Coupling. This one joins a low flushing water line in chlorinator building. Another Style 38 is on the vertical line at upper right.

Miami Sewer Project Associates designed the new Virginia Key Sewage Disposal Plant at Miami, Florida, for high reliability and convenient modification.

They sought easy dismantling of permanent aeration lines so maintenance and repair of equipment could be performed quickly. They also wanted an easy way to dismount and set up dewatering lines in new positions as required.

Dresser Couplings were chosen as the ideal answer to this common disposal plant piping problem. They went in quickly, easily and accurately — five precision-made parts, plus required bolts, reduce all pipe joining to a simple mechanical operation. Installations require only a wrench . . . average joining time, two man-minutes per bolt. And they're easy to install in tight places.

Dresser Couplings are a "must" for dismantling purposes. Removal is as easy as assembly . . . and all coupling parts may be re-used in the new piping setup. And, most important in any sewage disposal project, they remove strains on pumps and valves.

Proved in use for more than 60 years, no pipe joining method provides all the Dresser advantages . . . 100% tight, permanent, flexible, simple, fast and economical. Send for complete information about Dresser applications on water, sewage, and industrial waste projects. Write Dresser Manufacturing Division, Bradford, Pa. Sales offices in: New York, Philadelphia, Chicago, S. San Francisco, Houston, Denver, Toronto, Calgary.

(Continued from page 128)

to Ridge Rds. $715,000 Vogt, Ivers & Seaman, 34 W. 6 St., Cincinnati, consult. engrs.; widening 60 41 ft. Winton Rd. from N. Bend Rd. to Greenhills Corp. line, $595,000; Springdale Rd. bypass from West Sharon to Kemper Rds., $700,000; imprv. Wayne Ave. from Shepard Rd. to State Rte. 126, $395,000; widening 40 ft. Galbraith Rd. from East Branch of Millcreek to Hill Rd. $98,500; imprv. Sutton Ave. from Salem Park to Kellogg Ave. $776,000; imprv. Sutton Ave. from Glade Ave. to Salem Park, $110,000; imprv. Blue Rock Dr. from Colerain Pike to Cheviot Road, $530,000; imprv. Compton Rd. from Mt. Healthy Corp. Line to Winton Rd. $590,000. Geo. Lemmel, co. engr. CD 11/9.

▲ **WASHINGTON**—Bureau P. Rds. Dpt. Commerce, Morgan Bldg., Portland, Ore.

Kittitas Co.—grading, surf. 4 mi. and constr. bridge on Sunset Hy. near Bleweet Pass, $560,000.

Klickitat Co.—grading, surf. 4.1 mi. Mt. Adams Hy. north of Trout Lake, $180,000. Bids in June.

Mason Co.—grading 8 mi. Lake Cushman Rd. near Hoodsport, $500,000. Bids next month. F. E. Andrews, div. engr.

EARTHWORK, WATERWAYS

▲ **Tex., Daingerfield**—Northeast Texas Water Dist., Daingerfield, bond election soon for raising height of Ferrell Bridge Dam, to provide water sufficient for 7 towns in the dist., Jefferson, Avinger, Hughes Springs, Daingerfield, Pittsburg, Ore. City, Lone Star, $1,500,000.

▲ **Alaska, Sitka**—City, City Hall, voted $5,000,000 bonds Mar. 9 hydro-project on Blue Lake. CD 8/16/46.

AIRPORTS

Ill., Aurora—AIRPORT—City, City Hall, Aurora airport, $800,000. Ralph H. Burke Inc., 20 N. Wacker Dr., Chicago, consult. engrs.

Tex., Houston—HANGAR—Humble Oil & Refining Co., 1216 Main St., hangar, Houston International Airport, $369,000.

PUBLIC BUILDINGS

Ala., Birmingham—HIGH SCHOOL—Bd. Educ., 2015-7th Ave., Northern High School for Negroes. $600,000. CD 2/20/56.

▲ **Ala., Huntsville** — HOUSING — Huntsville Housing Auth., Huntsville, plans by Hofferbert & Ellis, Huntsville, 539 low-rent housing units. $6,000,000.

▲ **Ark., Little Rock**—PLANT—Arkansas Industrial Development Comm., c/o Little Rock Chamber of Commerce, 115 W. 6 St., 400,000 sq. ft. plant addn., 168-acre site adjacent to Hamilton Dr. and Patterson Ave. $3,000,000. The Teletype Corp., Div. of Western Electric Co., Chicago, Ill., lessee.

▲ **Ark., Pine Bluff**—HOSPITAL—Jefferson Co. Joe Henslee, co. judge, Pine Bluff, plans by Reed & Willis, First Natl. Bank Bldg., Pine Bluff, asd Wittenberg, Delony & Davidson, Pyramid Life Bldg. Little Rock, assoc. archts., 250-bed capacity county hospital. $5,000,000.

Calif., Oakland—SCHOOL—Oakland Unified School Dist., c/o Supt., 1025-2nd Ave., plans by Cantin & Cantin, 5652 College Ave., Oakland, wood frame, stucco elementary school, $500,000. CD 6/8.

▲ **Calif., Oxnard**—SCHOOL—Oxnard Union High School Dist., Oxnard, voted bonds Mar. 6, high school in Port Hueneme, $2,000,000. CD 2/25.

▲ **Calif., Pittsburg**—CREATIVE ARTS—Pittsburg Unified School Dist., c/o Secy., Pittsburg, plans by Cantin & Cantin, 690 Market St., San Francisco, 1 story, bsmnt., balcony, concrete, structural steel creative arts bldg. at Senior High School, incl. air conditioning, etc. $1,250,000. CD 5/25.

▲ **Calif., Redondo Beach**—HOSPITAL—South Bay Hospital Dist., Redondo Beach, plans by Walker, Kalionzes & Klingerman, 488 S. Van Vincente, Los Angeles, 4 story, bsmnt., 150-bed Type I, rein.-con. hospital, slab floors. $2,165,000.

Colo., Alamosa—DORMITORY—State of Colorado, Denver, dormitory for men and married students, $600,000.

Conn., Berlin—SCHOOL—Town, high school addn., $500,000. CD 10/10.

▲ **Conn., Norwalk**—HIGH SCHOOL—Town, Town Hall, plans by Lyons & Mather, consult. engrs.-archts. 211 State St., Bridgeport, Brien McMahon High School. $4,000,000. CD 11/28/56.

Conn., Rowayton—SCHOOL—Town, plans by William B. Cram, 15 Belden Ave., Norwalk, Rowayton School addn. $345,000.

▲ **Fla., Winter Park**—OFFICE—State Cabinet of State of Florida, Tallahassee, plans by Hugo R. Broleman, Jr., 1216 E. Colonial Dr., Orlando, state office building, $1,100,000. CD 2/12.

▲ **Ill., Glenview**—SCHOOL—Glenview School Dist. 34, 2701 Central Ave., plans by Bradley & Bradley, 924 N. Main St., Rockford, 1 story brick elementary school $420,000; 2 story, brick Junior High School addn. 2701 Central Ave. $750,000.

Iowa., Fenton—SCHOOLS—Bd. Directors, Community School Dist., K. M. Chase, supt. Schools, Fenton, voted $450,000 bonds, school $400,000. Haarstick, Lundgren & Assocs., 212 N. First Natl. Bank Bldg., St. Paul, Minn., archts. Work this year. CD 3/8.

▲ **Kan., Topeka**—SCHOOL—Bd. Educ., 415 W. 8 St., plans by Ekdahl, Davis & Depew, New England Bldg., Topeka, high school, $1,500,000. CD 4/18.

▲† **La., New Iberia**—HOUSING—Eighth Naval Dist., U. S. Naval Station, Bldg. 16, New Orleans, 431 housing units, New Iberia Naval Air Station, $7,500,000. Matkin & Fitch, 3105 Ryan St., Lake Charles, consult. engrs.

Mass., Chicopee—GYMNASIUM—City, School Dpt., John L. Fitzpatrick, supt., 135 Grape St., plans by Henry J. Tessier, 220 Dwight St., Springfield, gymnasium and swimming pool, $550,000. Harrison G. White Co., 9 Harrison St., Springfield, consult. engr.

Mass., Pepperell—SCHOOL—Town, Austin King, chn. Bldg. Comn., elementary school, $350,000. Constr. in 1958.

▲ **Mich., Cadillac**—SCHOOLS—City, L. A. Hanson, city mgr., plans by J & G Daverman Co., 924 Grandville Ave. S. W., Grand Rapids, two elementary schools. $1,200,000.

▲ **Mich., Jackson**—SCHOOL—City, City Hall, election Apr. 1 for authorization, Foote Hospital, $2,000,000. CD 1/5/53.

▲ **Mich., Oxford**—SCHOOL—Bd. Educ., Oxford Community Schools, high school, $1,200,000.

Mich., Roseville—GARAGE—Village, Robert Nunn, clk., 27700 Gratiot Ave., garage to house Water Dpt., Dpt. Public Works, and Engineering Dpt., also fire station and community center. $550,000.

Minn., Excelsior—SCHOOL—Bd. Educ., Minnetonka School Dist. No. 7, K. Lebbey, pres., $1,500,000 bond election May 21, 3 elementary schools, Clear Springs, Excelsior and Griveland. Bissell & Belair, 1111 Nicollet Ave., Minneapolis, archts. CD 2/8.

▲ **Minn., Faribault** — SCHOOL — Bd. Educ., C. E. Sommer, clk., voted $2,350,000 bonds Mar. 12, Senior High School, and elementary school. To go ahead in 1957. CD 12/20.

Minn., Montevideo—SCHOOL—Bd. Educ., G. W. Clawson, clk., voted $550,000 bonds Mar. 12, elementary school, $500,000. Pass, Rockey & Church, Mankato, archts. Constr. in 1957.

Minn., Richfield (P. O. Minneapolis)—GARAGE—Village, O. R. VanKrevelen, mgr., municipal garage and equip. storage bldg. at site southeast of 69 and Cedar Sts.; remodel city hall, $300,000. L. J. Jolly, village engr. Constr. in 1957.

Mo., Browning—SCHOOL—Reorganized School Dist. R-1, defeated $470,000 bonds Mar. 12, combination elementary and high school. Dan R. Sandford & Sons, 800 Westport Rd., Kansas City, Mo., archts. CD 3/1.

Mo., Grant City—SCHOOL—Worth Co. School Dist., R-1, Chas. H. Shaffner, supt. Schools, Grant City, $590,000 bond election Apr. 2, Junior-Senior High School, Terrell & McCall, 1016 Baltimore Ave., Kansas City 5, Mo., archts.

(Continued on page 132)

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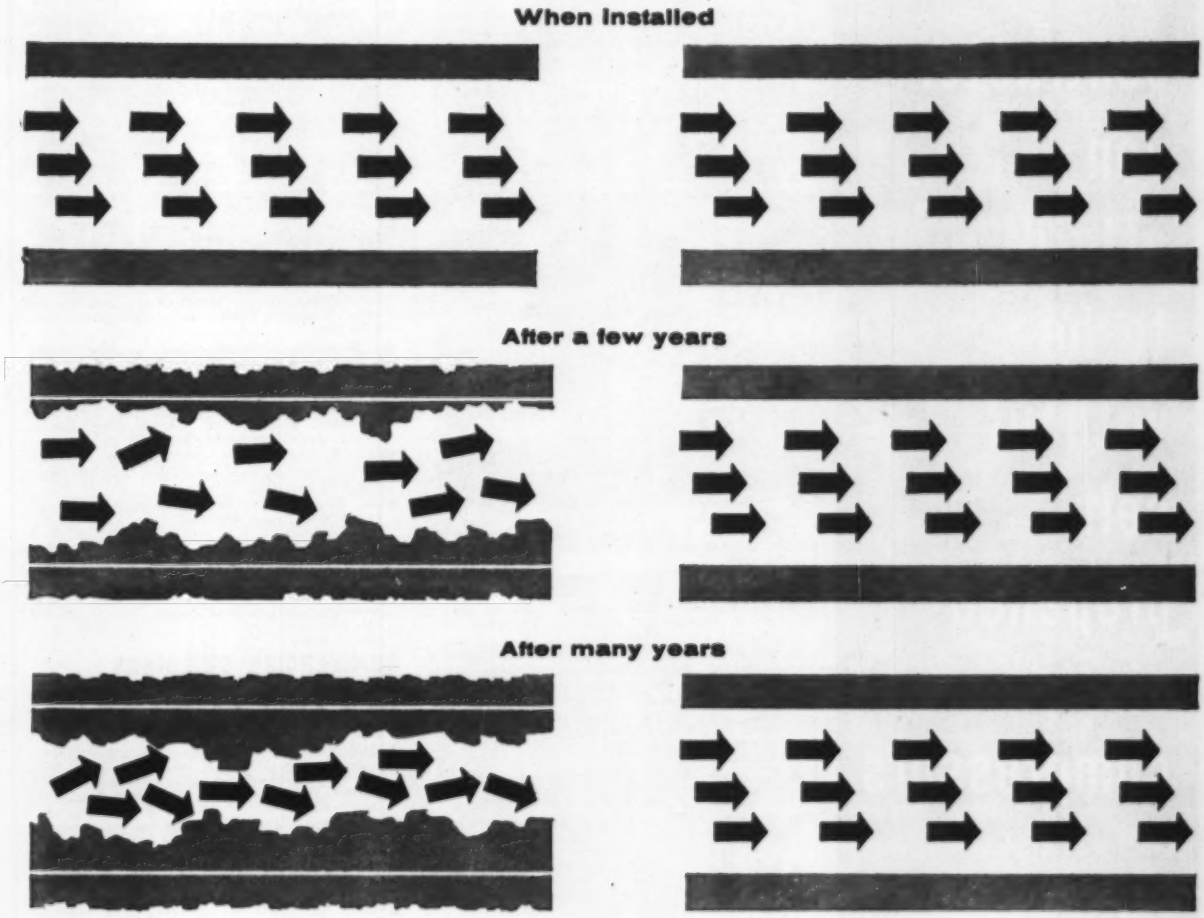

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(Continued from page 130)

▲ **Mo., St. Louis County**—SCHOOLS—School Dist. R8, St. Louis County, Bd. Educ., Noah Gray, supt. Schools, 4900 S. Lindberg Blvd., St. Louis County, Zone 23, $1,000,000 bond election Apr. 2, schools, school addns. Charles W. Lorenz, 700 N. Ballas Rd., Rte. 13, Box 137B, Kirkwood, Zone 22, archt. CD 1/30/56.

▲ **Mo., St. Louis**—SCHOOL—Bd. Educ., George H. Fletcher, comr. School Bldgs., high school northwestern part of city. $2,750,000; gymnasium for McKinley High School, 2156 Russell Blvd., $1,000,000. CD 12/6

▲† **Neb., Fort Crook**—HOUSING—U. S. Eng., 1709 Jackson St., Omaha, plans by Steele, Sandham & Steele, Electric Bldg., Omaha, 400 dwelling units Offutt Air Force Base, $4,000,000. Henningson, Durham & Richardson, 2962 Harney St., Omaha, consult. engrs. CD 6/19/56, under Commercial Buildings.

▲ **Neb., Scottsbluff**—SCHOOL—Bd. Educ., elementary school, Senior High School, remodel present high school, addn. to two grade schools. $2,500,000. CD 1/10/55.

▲ **N. J., Belvidere**—COURT HOUSE—Bd. Freeholders Warren Co., plans by Hugh Moore Jr., 73 North Second St., Easton, reconstr. and addn. to county court house. $1,243,000.

N. J., Deal—SCHOOL—Bd. Educ. plans by Coffin, Coffin & Ronfeldt, Borwne Rd. Wayside, Asbury Park, Deal Elementary School addn. $500,000.

N. J., Montvale—RESTAURANT—Garden State Parkway Auth., 12 Broad St., Red Bank, plans by Urbahn, Brayton & Burrows, 654 Madison Ave., New York, N. Y., 2 story, bsmnt., 23,500 sq. ft. restaurant, $550,000.

N. J., Paramus—LIBRARY—Boro of Paramas, Boro Hall, library, $360,000.

N. J., Plainfield—SCHOOL—Bd. Educ., Mt. Bethel, Warren Twp., plans by Alexander Merchant Associates, 1 Elm Row, New Brunswick, school, at Mt. Bethel, Warren Twp. $450,000.

N. J., Princeton—HOUSING—Princeton Housing Auth., Princeton, plans by Charles K. Agle, 10 Nassau St., and William F. R. Ballard, assoc. archt., 123 E. 77 St., New York, N. Y. 50 unit housing. $750,000. CD 9/24.

N. J., Princeton—SCHOOL—Princeton Twp., Bd. Educ., elementary school, Riverside Dr. $344,000.

N. J., Quinton—SCHOOL—Quinton Twp. Bd. Educ., plans by Ballinger Co., 1625 Race St., Phila., Pa., elementary school, $344,000. CD 12/19.

N. J., Summit—SCHOOL—Bd. Educ. plans by David Ludlow, 332 Springfield Ave., elementary school, Oakley Ave. $850,000. Bids early Summer.

O., Berea—ELEMENTARY SCHOOL—Berea School Bd., Berea, plans by Mellenbrook, Foley & Scott, 20 Beech St., Berea, elementary school, Smith and Hummel Rds., Brook Park. $450,000-$500,000. CD 11/9.

▲ **O., Dayton**—SCHOOL—Dayton Bd. Educ., 348 W. Fists St., Nettie Lee Roth High School, Hoover Ave. $2,500,000. CD 1/11/55.

O., Henrietta—SCHOOL—Firelands Bd. Educ., Henrietta, plans by Beiswanger, Hoch, Olds & Vereke, 661 W. Market St., Akron, Junior High School, $450,000.

▲ **O., Toledo**—HOSPITAL—Ohio Dpt. P. Wks., Ohio Dpts. Bldg., Columbus, 2 dormitory-style hospital bldgs., Toledo State Hospital for Dpt. Mental Hygiene & Correction. $1,000,000. CD 2/17/52.

Okla., Muskogee—SCHOOL—Bd. Educ., Muskogee, plans by Fred E. Zaroor, Muskogee, Catholic High School addn. $602,000 CD 5/1.

▲† **Okla., Oklahoma City**—HOUSING—Procurement Officer, Tinker Field, Oklahoma City, plans by Hudgins Thompson & Ball, 1411 Clarsen St., 268-unit Capehart Housing, at Tinker Field, $1,742,000.

Ore., St. Helens—SCHOOL—Columbia County School Dist. 502C, St. Helens, voted bonds Mar. 5, remodeling Junior High School. $872,000. Annand, Boone & Lei, 1530 S. W. Taylor St., Portland, archts. CD 2/12.

Pa., Dowingtown—SCHOOL—Dowingtown Joint High School plans by Joseph F. Wigmore, 117 S. 17 St., Phila., Junior-Senior High School. $750,000. CD 12/20.

Pa., Jamestown—SCHOOL—Pymatuning Joint Consolidated School Bd., Jamestown, plans by Walter Mallorie, 54 Buhl Blvd., Sharon, school addn. $469,580.

Pa., Mayview—CHAPEL, etc.—General State Auth., 18 and Herr Sts., Harrisburg, plans by Sorber & Hoone, First National Bank Bldg., Greensburg, combination chapel, auditorium, gymnasium bldg. at Mayview State Hospital, $650,000. CD 3/1/56.

R. I., Cumberland—SCHOOL—Town, c/o Town Council, Town Hall, Cumberland, Ashton Grammar School, Ashton, $376,300. Construction in 1958.

R. I., Newport—SCHOOL—City School Comn., City Hall, Rogers High School addn. $350,000. Construction in 1958.

▲ **Tex., Austin**—STUDENT UNION, etc.—University of Texas, Admin. Bldg., Austin, tripling capacity existing student union bldg., $2,125,000. CD 5/7; physics bldg. enlargement, $750,000. CD 6/19; physics, $1,500,000. CD 10/10/52; engineering, $1,000,000. CD 11/10/52; science wings completion, $433,000. Page, Southerland & Page, Box 855, consult. engrs.

Tex., Beaumont — SCHOOL — Beaumont Independent School Dist., Beaumont, 80,000 sq. ft. masonry, steel frame Stephen F. Austin Junior High School, $800,000. Dickson, Dickson & Assocs., 2205 Orange St., archts. and consult. engrs. CD 5/29.

Tex., Bonham—SCHOOL—Bonham Independent School Dist., Bonham, plans by Fred Buford & Assocs., c/o Interurban Bldg., Dallas, school, $400,000. Bond election planned.

Tex., College Station—ATHLETES DORMITORY—A&M College of Texas, College Station, plans by Adams & Adams, 500 Hutchins St., San Antonio, 3 story, masonry athletes dormitory, $350,000. CD 3/7.

Tex., Freeport — SCHOOLS — Brazosport Independent School Dist., Freeport, plans by Emory S. White, & Arne G. Engberg, 2017 S. Shepherd St., Houston, Junior High and elementary school addns., at Lake Jackson, $525,000; elementary school classrooms and cafeteria West Freeport, $350,000. Bernard Johnson & Assocs., 4926 Travis St., and Walter P. Moore, 2 Pinedale St., Houston, Tex., consult. engr. CD 3/5.

Tex., Houston—SCHOOL—Houston Independent School Dist., 1300 Capitol St., plans by Cameron Fairchild & Assocs., 2626 W. Dallas Ave., 38,400 sq. ft. masonry Briar Grove Elementary School, $400,000. Walter P. Moore, 2 Pinedale St., and L. E. Von Goglom, 1706 Althea St., consult. engrs. CD 3/8.

Tex., Longview—COURTHOUSE—Gregg Co., c/o Comrs. Court, c/o Courthouse, constr. courthouse annex. $750,000. CD 7/28/54.

Tex., New Braunfels—SCHOOL—New Braunfels Independent School Dist., New Braunfels, plans by Jeremiah Schmidt, c/o Schmidt Bldg., Lone Star and Locke Elementary School, Proj. Tex. 56-C-219-A6, $391,850.

Vt., Morrisville—HOSPITAL—Copley Hospital, Morrisville, plans by Leland, Larsen, Bradley & Hubbard, 711 Boylston St., Boston, Mass. hospital approx. $360,000. Constr. in 1957.

Wash., Kent—SCHOOL—School Dist. 415, Kent, plans by Waldron & Dietb, 1411 4th Ave. Bldg., Seattle, Zone 1, Junior High School. $400,000. CD 10/5.

Wash., Orting — HOSPITAL — State Dpt. Institution, Olympia, hospital at soldier's home, $400,000. Work may start this year.

Wash., Port Angeles—SCHOOL—School Dist. No. 17, Port Angeles, voted $625,000 bonds Feb. 19, high school addns. CD 1/2.

▲ **Wis., Milwaukee**—SCHOOL—School Bd., 1111 N. 10 St., Boys' Trade and Technical High school addn., remodeling, Virginia St. $1,000,000.

▲† **Alaska**—ATOMIC POWER PLANT—U. S. Eng., Anchorage, 1,500-kw atomic power plant $4,126,000. Alco Productions, Inc., 1 Nott St., Schenectady, N. Y. consult. engrs.

COMMERCIAL BUILDINGS

Ala., Birmingham—SCHOOL—Bd. Trustees Brooke Hill School, 26 Rhoades Circle, plans by Warren, Knight & Davis, Protective Life Bldg., girls school, Altamont Rd. exten. on Red Mountain. $500,000.

▲ **Calif., Garden Grove**—RESIDENTIAL SUBDIVISION—Louis Laramore, 1146½ E. Whittier Blvd., Whittier, 269 lot subdivision, known as Tract 3156, $2,700,000. Voorheis, Trindle & Nelson, 12692 Garden Grove Blvd., consult. engrs.

Calif., Hanford—HOSPITAL—Sacred Heart Hospital, c/o Administrator, Hanford, plans by Vincent Buckley & Fred Houwelling, 166 Geary St., San Francisco, hospital wing incl. admin. offices, labs, pediatrics ward, surgery, pharmacy, etc., Sacred Heart Hospital. $500,000. CD 3/28/45.

▲ **Calif., La Canada**—RESIDENTIAL SUBDIVISION—Enchanted Hills Unit 1, 3436 N. Verdugo Rd., Glendale, 205 lot subdivision, known as Tract 23638. $2,000,000.

▲ **Calif., Los Angeles**—RESIDENTIAL SUBDIVISION—Fame Le Sage, 17640 Sherman Way, Van Nuys, 156 lot subdivision in Tract 21000, north of Burbank Blvd. and west of Mantou Ave., $1,500,000; Voorheis-Trindle Co., 4645 Van Nuys Blvd., Van Nuys, archt.

▲ **Calif., Merced**—HOSPITAL—Mercy Hospital, Merced, constr. Mercy Hospital addn. $1,000,000.

▲ **Calif., San Francisco**—HOSPITAL—Bd. Directors, Saint Francis Memorial Hospital, Hyde and Bush Sts., St. Francis Memorial Hospital addn. $1,271,956.

▲ **Calif., San Mateo**—SUBDIVISION DEVELOPMENT—Godbey Development Co., 10820 Norwalk Blvd., Santa Fe Springs, 225 home subdivision between Parrott Dr. and Polhemus Rd. near here. $4,837,500.

Conn., Branford—SHOPPING CENTER—Jacob J. Cooley, 557 Ellsworth Ave., New Haven, plans by Charles H. Abramowitz, 52 Goffe Terrace, New Haven, shopping center, Route 1. $450,000.

Conn., Fairfield—SHOPPING CENTER—Grand Union Inc., 100 Broadway, East Paterson, Conn., shopping center, supermarket, 8 stores and branch bank, 48,100 ft. $600,000.

Conn., North Haven—SHOPPING CENTER—Drazen Lumber Co., 144 Water St., New Haven, plans by Leo F. Caproni, consult. engr.-archt., 132 Temple St., New Haven, shopping center, 87 Washington Ave. $345,000.

Conn., Stamford—APARTMENTS—Courtland Corp., Sound View Dr., plans by Bertram L. Whinston, Long Hill Dr., 40-unit, 2 story, frame, brick veneer apartments. $355,000.

Del., Dover—DORMITORY, etc.—Wellesley Junior College, Dover, plans by Whiteside, Moeckle & Carbondell, 909 Tatnall St., Wilmington, women's dormitory, Constr. in 1958; college alterations, Constr. in 1959. $450,000.

▲ **Del., Marshallton** — SCHOOL EXPANSION — Kruse School, 1400 Newport-Gap Pike, Wilmington, plans

by Victorine & Samuel Homsey, 917 Gilpin Ave., Wilmington, school expansion, $2,221,000.

Del., Wilmington—CHURCH, etc.—Immaculate Heart of Mary Roman Catholic Church, 310 N. Jackson St. plans by Gleeson & Mulrooney, 1612 Market st., Phila., Pa., church and school. $344,000. Charles H. Wolfe, 112 S. 16 St., Phila., Pa., engr.

D. C., Wash.—CHURCH—First Congregational Church, 10 and G Sts. N. W. plans by Milton L. Grigg, 1420 Prince St., Alexandria, Va., church on present site. $400,000.

Ill., Chicago—CHURCH—St. Luke's Lutheran Church, 1500 W. Belmont Ave., plans by Harold A. Stahl, 310 N. Michigan Ave., church, 1500 W. Belmont Ave. $400,000.

Iowa, Council Bluffs—CHURCH, etc.—Our Lady Queen of Apostles, c/o J. E. Loftus, archt., 3567 Leavenworth St., Omaha, Neb., church and social hall. $350,000-$400,000. Bids about April.

▲ **Iowa, Des Moines**—HOSPITAL—Lutheran Hospital, 716 Parnell St., plans by Wetherell & Harrison, 506 Shops Bldg., hospital addn. $1,000,000. Bids in April.

Kan., Manhattan—HOSPITAL—St. Mary's Hospital for Sisters of St. Joseph, Manhattan, hospital. $350,000.

▲ **Kan., Topeka**—APARTMENT—Town & Country Realtors, 3630 Drury Lane, cooperative apartment house, 801 W. Dudley Rd. $3,200,000.

Kan., Wichita—DORMITORY—Friends University, Lowell E. Roberts, interim pres., 106 E. Second St., Zone 2, plans by Thomas, Harris, Calvin & Assoc., 231 W. Second St., 3 story, rein.-con., brick women's dormitory; 3 story, rein.-con., men's dormitory, $705,-000. CD 1/18.

Mass., Malden—HOSPITAL—Malden Hospital, Hospital Rd., plans by James H. Ritchie & Assoc., 135 Clarendon St., Boston, 4 story hospital addn. Hospital Rd. $350,000. Constr. in 1958.

▲ **Mich., Detroit**—COMMUNITY CENTER—United Jewish Charities, Inc., 163 Madison St., plans by Paul Tilds & Assoc., 1021 Livernois St., Ferndale, Jewish Community Center, Curtis and Meyers Sts. $1,500,000. CD 6/21/55.

▲ **Mich., Kalamazoo**—ART CENTER—Kalamazoo Institute of Arts and Kalamazoo College, Kalamazoo, plans by Eero Saarinen & Assoc., West Long Lake Rd., Bloomfield Hills, art center, $1,000,000.

▲ **Mich., Livonia**—HOMES—Ira Hotchkiss, 2940 East Eight Mile Rd., Detroit, Zone 34, Moulin Rouge Development, 465 home sites. $9,000,000.

▲ **Mich., Marysville**—OFFICE—Owner, c/o Charles M. Valentine, archt., 1985 Gratiot St., Marysville, 8 story, 50x250 ft. office. $1,500,000.

▲ **Mo., Kansas City**—HOTEL—Prom Investment Co., c/o Black, Sivalls & Bryson, 7500 E. 12 St., Kansas City, Mo., plans by Windrom, Haglund & Venable, Chisca Hotel, Memphis, Tenn., motor hotel, swimming pool, Sixth and Main Sts. $1,000,000.

▲ **N. J., Blackwood**—SCHOOL, etc.—Mother of the Savior Seminary, Blackwood, plans by Haag & D'Entremont, Jenkintown, high school, administration bldg., library, $800,000, Scheduled for 1958; faculty house, $200,000, Scheduled for 1957.

▲ **N. J., Camden**—SCHOOL OF NURSING—Archdiocese of Camden, 721 Cooper St., and Our Lady of Lourdes Hospital, 1600 Haddon Ave., plans by Paul Reilly, 115 Fifth Ave., New York, school of nursing, adjoining hospital on Haddon Ave. $1,159,000. CD 3/4.

N. J., Princeton—BIOLOGY—Princeton University, Princeton, biology bldg. $344,000.

▲ **N. J., Ramsey**—HOTEL—The Burton Hotel Co., 960 Main St., Hackensack, plans by Thomas E. Torricelli, 96 Reservoir Ave., River Edge, hotel, Franklin Turnpike and Airmount Ave., $2,500,000 .

N. Y., Buffalo—OFFICE—Benderson Development Co., 123 Franklin St., 3 story, 45,000 sq. ft. brick, stone office, 698 Delaware Ave. $500,000.

▲ **N. Y., New Rochelle**—RESIDENCE HALL—College of New Rochelle, 29 Castle Place, plans by Starrett & Van Vleck, 267 Fifth Ave., New York, Zone 16, residence hall, $500,000; fine arts bldg., $1,000,-000. To go ahead in Summer 1957.

N. Y., New York—PARISH—First Presbyterian Church, 12 W. 12 St., Zone 11, plans by Edgar A. Tafel, 14 E. 11 St., Zone 3, parish bldg. at site. $750,000. CD 3/1.

N. Y., North Tarrytown — SCHOOL — Archdiocesan Bldg. Comn., 451 Madison Ave., New York, Zone 22, plans by Knappe & Johnson, 390 E. 150 St., New York, Zone 55, annex for Archbishop Stepinac High School, White Plains, at St. Theresa's School. $344,000.

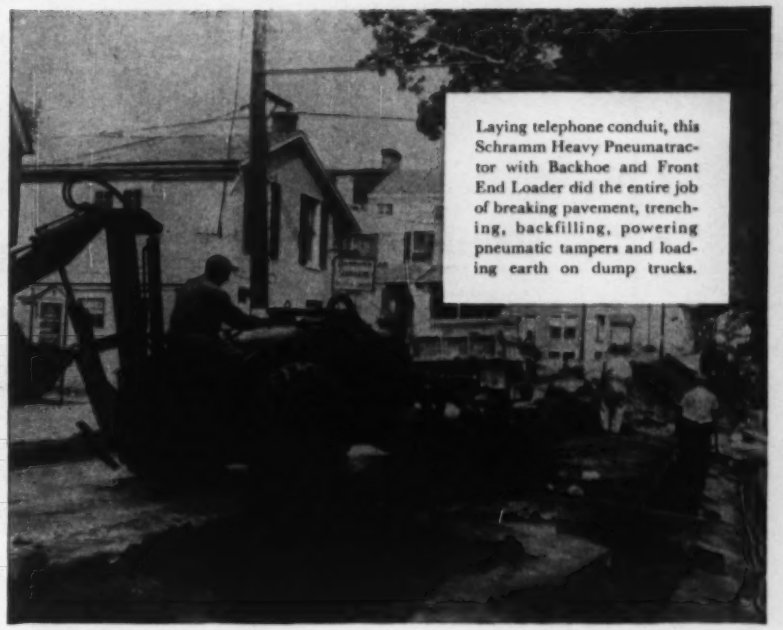
▲ **N. Y., Rochester**—NOVITIATE—Sisters of Mercy, 1437 Blossom Rd., 4 story novitiate, junior college and 1 story elementary school and reading laboratory. $2,-000,000.

▲ **O., Cincinnati**—OFFICE—Western & Southern Life Insurance Co., 4 and Broadway, plans by Hake & Hake, 2400 Gilbert St., office addn. $2,500,000. O. W. Metz, 20 E. McMillan St., consult. engr.

▲ **O., Wickliffe**—SEMINARY WINGS—Catholic Diocese of Cleveland, 1027 Superior Ave., Cleveland, Zone 14, plans by Stickle & Assoc., 2422 Prospect Ave., Cleveland, Zone 15, 5 extensions of existing Borromeo Minor Seminary Wings, Bishop Rd. and Euclid Ave. $1,500,-000. Bids about end of April.

▲ **Okla., Tulsa**—CHILDRENS WING—Hillcrest Hospital, 1653 E. 12 St.,plans by Hugh R. Humphreys, Atco Bldg., Tulsa, Okla., childrens wing addn. to Hillcrest Hospital. $2,000,000.

(Continued on page 136)



Laying telephone conduit, this Schramm Heavy Pneumatractor with Backhoe and Front End Loader did the entire job of breaking pavement, trenching, backfilling, powering pneumatic tampers and loading earth on dump trucks.

ROAD BUILDER SAYS:

"It does everything but lay concrete"

Schramm Heavy Pneumatractor with Backhoe attachment. This unit can excavate for pipe line or conduits to widths up to 36 inches, and to a depth of 9 feet 6 inches.

Front End Loader on Schramm Heavy Pneumatractor makes short work of moving hard-to-handle materials. Full-cubic-yard bucket lifts, hauls and loads up to 4000 pounds.

How many kinds of machines do you need to break pavement, trench, backfill, furnish compressed air for tampers and form-pin drivers, load surplus earth on trucks? *Only one*—when it's a Schramm Heavy Pneumatractor.

With backhoe and front loader, here's a *whole fleet* of road machinery in one versatile unit! Pneumatractor is a one-man operated, self-propelled tractor and air compression plant combined. Drives right to the job and along with the job. Converts in an instant from tractor to compressor, right from the instrument panel. Furnishes 125 cfm of 100 psi air for operating all sorts of air tools. Pushes, pulls, powers, loads and lifts anything a wheel tractor can handle. And does all this at low cost!

For example: *on original cost*, Schramm Pneumatractor is far more economical than most comparable air compressors alone. *In operation*, Schramm's patented Pneumastat control regulates engine speed in accordance with air demands, saves up to 50% on fuel costs. *On maintenance* it saves, too; you service only one machine instead of several, and any engine mechanic can service a Schramm Compressor with little instruction. *On returns* you really gain: Pneumatractor's versatility gives much more work per dollar invested.

Complete details of the Schramm Heavy Pneumatractor are yours for the asking. Write us for Catalog 5540—no obligation.

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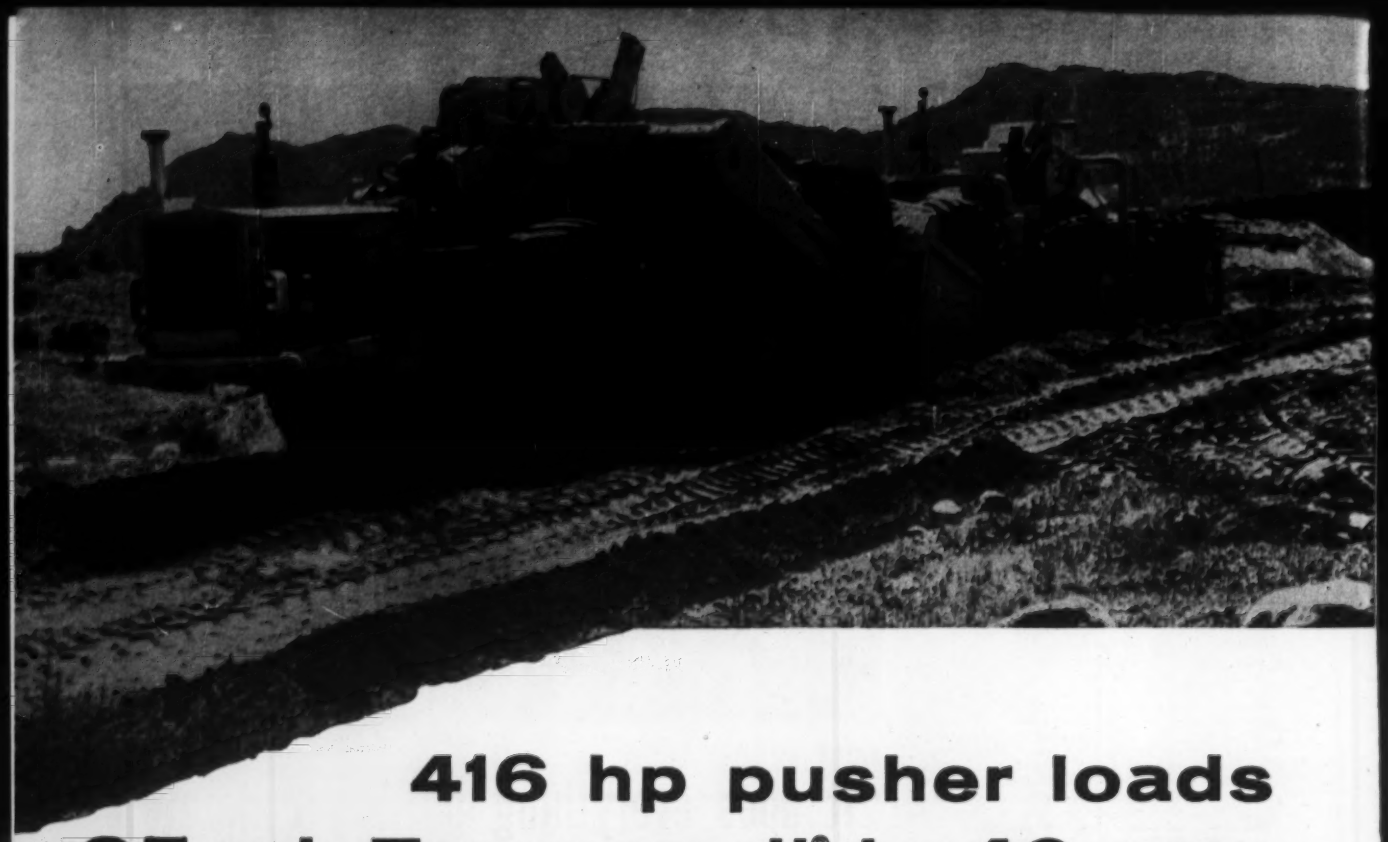

416 hp pusher loads 25-yd. Tournapull® in 40 sec.

The construction industry's most powerful rubber-tired pusher, the 416 hp LeTourneau-Westinghouse Twin-C*, set records for speed, mobility, and power recently when it worked with 2 big 25-yd. Model B Tournapulls on an 840,000-yard grading job for Nick Pinello of Colorado Springs. The job involved leveling the site of a new shopping center in a suburb south of the city. On this contract, scrapers moved tight shale and clay, with some gravel — checked at 15% in-place moisture, on the average.

Pinello had L-W scrapers in two other work teams on the project. Four 18-yd. self-propelled C Tournapulls were push-loaded by a crawler as were three crawler-drawn 23-yd. scrapers. (Chart shows performance of all teams.)

With powerful 416 hp dual-engined Twin-C behind the big 25-yard "B's", each Tournapull was heaped with material in less than 40 sec.

Twin-C's air-actuated, constant-mesh transmissions, with torque converters, drive 40-ton pusher at speeds up to 20 mph. Work records show it could easily handle up to 4 big scrapers working on ½-mi. round-trip hauls.

Production for all teams averaged over 14,000. yds. in an 8-hour day. When "B" and "C" teams worked shorter than average hauls (1,200'), they moved 18,000 yds. Pinello finished 30 days ahead of schedule, without working his machines to capacity.

TOTALS OF TEAM PERFORMANCE

Here are team figures for one 9-hr. day's production of all scrapers and pushers on Pinello's spread:

Team 1: 2 B Tournapulls (25-yd.) with Twin-C Pusher.

Cycle time	3 min.
Trips per hr.	16
Average load	20 yds.
Hourly output per "B"	320 yds.
One-Way haul	1,200'
Load	40 sec.
Haul	60 sec.
Dump	20 sec.
Return	60 sec.
Cycle time	3 min.
Team daily total	5,000 yds.
Output per scraper: 1,200' haul	*2,500 yds.*

Team 2: 4 C Tournapulls (18-yd.) with two 190 hp crawler-tractor pushers.

Cycle time	3 min.
Trips per hr.	16
Average load	12 yds.
Hourly output per "C"	192 yds.
Approximately same haul and cycle time as Team 1	
Team daily total	6,000 yds.
Output per scraper: 1,200' haul	*1,500 yds.*

Team 3: 3 Scrapers (23-yd.) drawn by 190 hp crawler-tractors with a 190 hp crawler-tractor pusher.

One-Way haul	750'
Team daily total	3,000 yds.
Output per scraper: 750' haul	*1,000 yds.*

Tires compacted spread material

The operation was a balanced cut and fill job. Maximum cut was 45', maximum fill, 30'. Soil was fairly tight. With big tires on scrapers aiding compaction, and sheep's foot roller doing final compacting, Pinello had no trouble getting 90% Proctor density.

Production on steady level

Pinello ran this 840,000-yd. grading job with the precision of an 8-day clock. Production was good and steady, above average at all times.

When Twin-C push-loads this big B Tournapull, a total of 709 hp is concentrated in forward thrust. Machines shown here were among 10 L-W units used by Nick Pinello in moving 840,000 yds. for a new shopping center near Colorado Springs, Colo. Twin-C and 2 "B's" worked as a team. Loading time in tight shale-clay-gravel was only 40 secs.

Hauling to fill, B Tournapull takes advantage of high speed. Rig completed ½-mi. cycle in 3 min. Bank at right is part of fill. At this stage, material moved by Pinello's scrapers was used to dress edge of fill.

An Adams heavy-duty grader was used by Pinello for haul-road maintenance and leveling of fill area. High-speed grader was able to keep up with production of three "B's", four "C's", and three L-W tractor-drawn scrapers.

According to Pinello: "That's all I want — good *steady* production. I keep my scrapers rolling at 14 miles per hour, even though they could double that on the straightaway. Excessive highballing costs a contractor money. Repair costs go up, and so does downtime. At the end of the job, the profit column reads zero."

"Machines are money-makers"

Pinello is proud of his men and his machines. "Today's machines are money-makers," he says. "I like the 'Pulls of course, that's why I got 'em. The all-electric controls are fast, and safe. The machine is easier to maneuver with electric controls. Maintenance is low, and repair is a snap."

Nick Pinello gives each of his operators a strong sense of responsibility for controlling operating cost of rigs, by having them handle their own servicing and repair work at end of shift. According to Pinello, "Any operator on my job can tear 'em down and fix 'em." This unusual feature of Pinello's operation pays off.

Pinello doesn't believe that racing his rigs pays off. He doesn't want operator to "give-it-the-gun", trying to lap another operator. He doesn't want his machines sidelined for costly repair work. He educates his operators to go after the steady *profitable* production.

Men, machines well managed

Besides good men and good machines, a third factor deserves credit for Pinello's success in business. Third profit producer on all his jobs is Pinello's own good management of men and machines. He schedules a precision timetable to get maximum team output and insists that all units roll on schedule all day long, every working day.

Investigate the new 27-yd. "B" Fullpak* Scraper and the 18-yd. "C" Tournapulls for your production dirt-moving. And, for that faster loading, check the 416 hp Twin-C Pusher. Call or write for detailed information.

*Trademark P-1298-H

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

(Continued from page 133)

Pa., Abington—SCHOOL—Northeast Christian Day School, 6220 N. Howard St., Phila., Day School, paving, sewage disposal system. $344,000. Harold M. Neal, Bristol, consult. engr.

Pa., Conshohocken—OFFICE—Bell Telephone Co., 1835 Arch St., Phila., plans by Maurice Fletcher, 226 S. 16 St., Phila., 2 story, bsmnt., brick, rein.-conc 60,000 sq. ft. office, $500,000.

▲ **Pa., Haverford**—HOSPITAL—Haverford Hospital, c/o Philip J. Diamond, archt., 973 West Ave., Springfield, 1 story, bsmnt., brick hospital, $1,000,000. Ernest A. D'Ambly, 117 S. 17 St., Phila., consult. engr.

Pa., Phila. — SYNAGOGUE — Beth Emeth Synagogue, Bustleton Ave. and Unruh St., plans by Sabatino & Fishman, 116 S. 19 St., synagogue, classrooms and social hall. $344,000.

▲ **Pa., Phila.**—SCHOOL—Moore Institute of Art, Science & Industry, 1920 Race St., plans by Harbeson Hough Livingston & Larson, 117 S. 17 St., school. $1,750,000. Sauter & Castor. 1411 Walnut St., engrs. Bids in June.

▲ **Pa., Phila.**—SHOPPING CENTER—Owner, c/o S. Sherwin Rochlis, archt., 1325 Walnut St., shopping center with parking area, Bustleton Ave. and Bergen St. $1,000,000.

Pa., Phila.—CHURCH—St. Clements R. C. Church, 71 and Woodland Ave., plans by Peter F. Getz, 44 S. Lansdowne Ave., Lansdowne, church. $500,000.

▲ **Pa., Phila.**—DORMITORIES—University of Penna., 209 S. 36 St., plans by Eero Saarinen & Assocs., West Long Lake Rd., Bloomfield Hills, Mich., women's dormitories. $3,000,000. CD 10/14/46.

Pa., Phila.—FACULTY DINING HALL—University of Penna., 209 S. 36 St., plans by Hatfield Martin & White, 266 S. 17 St., faculty dining hall, 36 and Walnut Sts. $400,000.

Pa., Pittsburgh—HOME—Protestant Home for Children, 1940 Perrysville Ave., plans by Schell, Deeter & Stott, Gateway Center 3, 1 and 2 story, steel, brick home for children, $500,000.

Pa., Quakertown — HOSPITAL — Quakertown Community Hospital, Quakertown, plans by Ballinger Co., 1625 Race St., Phila., hospital addn., alterations. $400,000.

▲ **Pa., Upper Darby**—SALES and SERVICE—Sidney J. Goostein, 68 and Market Sts., plans by Lewis J. Cowan, 1505 Pine St., Phila., sales and service bldg. $1,000,000.

▲ **Pa., Valley Forge**—MUSEUM—Valley Forge Historical Society, Dr. John Robbins Hart, pres., Valley Forge, museum, $1,000,000.

Pa., Villanova — COLLEGE — Northeastern Institute for Christian Education, 356 Vassar Ave., Swarthmore, college addns., alterations. $344,000.

▲ **R. I., Warwick**—SHOPPING CENTER—Muradian Realty Trust Co., 148 Church St., Whitensville, Mass., shopping center, 13½ acres Post Rd. $1,000,000. Constr. in Spring, Richard Malkasian, 101 Tremont St., Boston, Mass., consult. engr.

Tex., Denison—HOTEL, etc.—Tanglewood Hills, c/o J. E. Foster, 111, Contractor & Assocs., 3671 Encanto Dr., Fort Worth, 105 room masonry hotel, incl. swimming pool 13 mi. northwest of here. $750,000.

Tex., El Paso — STUDENT CENTER — Texas Western College, c/o C. A. Smith, bus. mgr., Box 180, student center. $580,000. Page, Southerland & Page, Box 855, Austin, consult. engrs. CD 2/18.

Tex., Houston—DWELLINGS—Embe Development Co., 1405 S. Post Oak Rd., 28 dwellings on Rue and St. Lo Streets. $352,000.

Tex., Houston—BOWLING ALLEY—Harry W. Hennies & Henry E. Runge, c/o Bunker Hill or 1503 Hadley St., plans by Wm F. Wortham, Jr., 1503 Hadley St., 24-lane bowling alley, 11120 S. Post Oak Rd., to be called "Post Oak Lanes". $400,000; a 2nd 24-lane bowling alley, $350,000.

Tex., Houston — APARTMENT — Hermann Drive Assocs., 1400 Hermann Dr., plans by Kelly & Gruzen, 80 5th Ave., New York, N. Y., 16 story apartment-hotel. $450,000. James I. Stillman, 1510 Barbee St., Houston, Tex., struc. engrs. Dale S. Cooper & Assocs., 3815 Garrott St., consult. engrs.

Tex., Houston—BOWLING ALLEY—M. I. Leacher, Harold Raizes & Assocs., 7311 Almeda St., 24-lane bowling alley, South Park Blvd., named "South Bowl Park". $450,000.

▲ **Tex., Houston**—APARTMENT, etc.—James A. McBride, 3807 Kirby St., Houston, Tex., developer, apartment project, 40 bldgs. and 400 total units, Braes-Link Subdivision, $4,000,000; masonry shopping center, $1,000,000.

Tex., San Antonio—SUPERMARKET—Community Realty Co., 3022 E. Houston St., plans by Reginald Roberts Assocs., 2600 N. McCullough, supermarket, for Handy-Andy Chain Stores, 53-acre tract in Balcones Heights, Fredericksburg, Rd. and Loop 13. $750,000.

Tex., San Antonio — PARISH-CHURCH — Holy Rosary Parish, c/o Most Rev. Robert E. Lucey, Archbishop, 230 Dwyer Ave., plans by Paul G. Silver & Co., 1919½ Cincinnati Ave., parish-church, (Proj. 610a) $350,000; R. Marvin Shipman, 203 W. Olmos Dr., Floyd A. Covington, 1406 W. Elsmere St., and Paul G. Silber Jr., 150 W. Olmos Dr., San Antonio, consult. engrs.

Utah, Provo—HOSPITAL—L. D. S. Church, 47 E. South Temple St., Salt Lake City, plans by Willard C. Nelson, Box 48, Provo, 3 story on new wing of L. D. S. hospital, Utah Valley Hospital addn. $500,000.

Wis., Kenosha—CHURCH, etc.—St. Mary's Lutheran Congregation, 6442 22 Ave., plans by Steffen & Kemp, 7218 W. North Ave., Wauwatisa, Zone 13, church, parsonage and garage. $500,000.

▲ **Alaska, Anchorage** — OFFICE — Susitna Corp., Box 3698, Eastchester Branch, Anchorage, 2 story, 120x 230 ft., steel, frame office bldg. $1,000,000.

▲ **Ont., Kitchener**—SCIENCE—Waterloo College, Kitchener, science bldg. $1,000,000; stadium $250,000. CD 9/25/47.

Que., Jonquiere—CHURCH—La Fabrique de la Paroisse de St. Georges, 360 rue St. Jean-Baptiste, Jonquiere, plans by Sylvio Brassard, 885 Ave. Moncton, Quebec City, Que., 52x150 ft. church. $500,000.

Que., Montreal—APARTMENT BLOCKS—Mr. Davidson, c/o H. M. Tolchinsky, archt., 5810 Cote St. Luc Rd., ten 60-suite apartment blocks, Favard and Marguerite Bourgeois St. $500,000.

INDUSTRIAL BUILDINGS

Ark., Pine Bluff—WAREHOUSE—Sears, Roebuck & Co., Pine Bluff, 28,000 sq. ft. warehouse, $150,000.

▲ **Calif., San Leandro**—PLANT—United Centrifugal Pumps, 580 2nd St., Oakland, plans by Thos. M. Culbertson, 806 Hearst St., Berkeley, 1 story, 116,300 sq. ft., tilt-up-constr. plant, $1,000,000. Hugh O'Neil, 610 16th St., Oakland, consult. engr.

Colo., Denver—PLANT—Continental Paper Products Co., W. Louisana Ave. and S. Jason St., plans by McCracken Heitt & Dronberger, consult. engrs.-archts., 308 W. 20th, Hutchinson, Kan., paper products plant. $200,000.

Conn., Greenwich—WAREHOUSE—First National Stores, Inc., 5 Middlesex Ave., Boston, Mass., plans by Ganteaume & McMullen, 99 Chauncey St., Boston, Mass., warehouse, Hamilton Ave., with railroad siding, $5,000,000.

Ill., Chicago—WAREHOUSE—Protectoseal Co., 1920 S. Western Ave., plans by M. B. Meyer, 7434 N. Harlem Ave., 3 story, brick warehouse addn. $100,000.

Kan., Wichita—PLANT—ExCel Packing Plant, 900 E. 21 St., plans by Robert Morris, Derby Bldg., plant. $150,000.

Ky., Louisville—WAREHOUSES—Martin Warehouse Co., 2935 S. Second St., 2 storage warehouses. (A) 11 and Ormsby St., (B) Old Shepardsville Rd. near Beuchel, $500,000.

Mass., Framingham—WAREHOUSE—Webb Supply Co., 38 Park St., 17,000 sq. ft. warehouse, Franklin St., $135,000. Bids about Apr. 1.

N. J., Florham Park—LABORATORY—John Wood Co., 70 Pine St., New York, N. Y., engineering laboratory, Hanover Rd., $350,000.

▲ **N. J., Hopewell**—RESEARCH LABORATORY—Socony Mobil Oil Co., 903 W. Grand Blvd., Detroit, Mich., plans by Cornelius L. T. Grabler, archt.-engr., Book Bldg., Detroit, Mich., research laboratory, $1,000,000. CD 12/3.

N. J., Woodbury—PLANT—Polyrex Chemical Co., Woodbury, plans by Thomas J. Malone, 26 S. Center St., Westville, mfg. plant addn. $100,000. Bids in April.

N. Y., New York—FACTORY—Worthen Realty Corp., 525 Tiffany St., Zone 59, plans by Julius Eckmann, 51 E. 42 St., Zone 17, 1 story factory at south side of Oak Point Ave. and west of Tiffany St. $255,000.

O., Columbus—PARKING GARAGE—Temple of Good Will, Inc., 150 E. Broad St., first 600-car unit of 2,000-car, 7 story, parking garage, Spring St. and Marconi Blvd. $882,000. H. K. Ferguson Co., 1783 E. 11 St., Cleveland, making traffic and feasibility survey.

▲ **O., Dayton**—FACTORY—National Cash Register Co., S. Main and "K" Sts., plans by Lorenz & Williams, 2600 Far Hills St., 150,000 sq. ft., 250x550 ft., 2 story in front and 1 story balance, steel masonry, factory, 265-car parking area and truck dock at rear. $1,500,000. CD 1/4.

Okla., Blackwell—COMPRESSOR STATION—Cities Service Gas Co., Bartlesville, 3600 hp. Blackwell Compressor Station addn. $375,000.

Pa., Conshohocken—FACTORY—Therman Research & Engineering Corp., Conshohocken, 1 story, 60,000 sq. ft. masonry, steel factory, $500,000.

Pa., Hatboro—FACTORY—Alexander-Tagg Industries, Inc., Hatboro, factory alterations, $100,000.

Pa., Kobuta—WAREHOUSE—Koppers Co., Koppers Bldg., Pittsburgs, 1 story, 69x96 ft., brick, block, steel warehouse, $160,000.

Pa., Phila.—WAREHOUSE, etc.—International Harvester Co., 660 E. Erie Ave., warehouse and office, service bldg. $344,000.

Tex., Bishop—PLANT, etc.—Celanese Corp. of America, 180 Madison Ave., New York, N. Y., plans by Smyth & Smyth, 1806 S. Alameda St., Corpus Christi, chemical plant, laboratory unit, $100,000. CD 2/8.

Tex., Garland—PLANT, etc.—Sherwin-Williams Co. of Texas, 1707 Live Oaks St., Dallas, steel frame, masonry paint varnish mfg. plant and raw storage warehouse. $300,000. J. Gordon Turnbull, Inc., Merc. Securities Bldg., Dallas, consult. engrs.

Tex., Houston—WAREHOUSE—Security Steel Co., c/o Leo Friedman, 4101 San Jacinto St., 200x300 ft., masonry, steel, concrete warehouse. $400,000.

▲ **Utah, Salt Lake City**—TERMINAL—Pacific Intermountain Express, C. E. Johnson, vice pres., 299 Adeline St., Oakland, Calif., terminal bldg., Redwood Rd. and S. Temple St. $1,500,000.

Wash., Pasco—BULK PLANT—Carter Oil Co., 2813 3 Ave. N., Billings, Mont., bulk plant with retail and shipping facilities. $500,000. Work to begin this year.

Wis., Rhinelander—STEAM GENERATING PLANT—Rhinelander Paper Co., Rhinelander, steam generating plant bldgs. $535,000. Bids soon. Pfeifer & Shultz, Wesley Temple Bldg., Minneapolis, Minn., consult. engrs.

▲ **Man., The Pas**—OIL REFINERY—Excelsior Refineries Ltd., 222 Tegler Bldg., Edmonton, Alta., oil refinery, on 170-acre site. $1,500,000.

Ont., London—FACTORY—S. F. Lawrason Co., Nelson St., plans by N. A. Armstrong, 67 Yonge St., Toronto, 1 story, 140x150 ft., brick, steel factory, Adelaide St. S. $140,000.

Ont., Toronto—PLANT, etc.—Outdoor Neon Displays Ltd., 50 Coleman Rd., 55,000 sq. ft. plant and office, Ellesmere Rd. $300,000.

▲ **Que., Hull**—PLANT—E. B. Eddy Co. Ltd., 2 Eddy St., plant addn., Laurier Ave. $6,000,000. Work to start in Spring. CD 2/11/55.

UNCLASSIFIED

Ala., Birmingham—GOLF RANGE—Sam D. Byrd, 8025 Bankhead Hy. E., golf driving range, golf training course for children, clubhouse on U. S. 78 E. near Birmingham city limits. $250,000.

Ala., Birmingham — RAIL TERMINAL — Louisville & Nashville R.R., H. C. Forman, ch. engr., 908 W. Bway., P. O. Box 1198, Louisville, Ky., remodel and realign rail terminal at Morris Ave. and 19th St. S. $250,000.

▲† **CALIFORNIA**—FISH HATCHERY—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., fish hatchery at Lewiston Dam, Trinity River, Central Valley Proj. $1,350,000.

Calif., Corte Madera—SWIMMING POOL—City, c/o Clerk, Town Hall, municipal swimming pool. $100,000.

Calif., Monterey—SMALL CRAFT HARBOR—City, City Hall, bond election May 13, small craft harbor on Monterey Bay. $390,000.

▲ **Calif., Stockton**—FAIRGROUNDS—2nd Dist. Agricultural Assn., c/o Mgr., P. O. Box 1609, fairground addns, incl. grandstand, jockey quarters, mall, fencing, track, paddock area, utilities near here. $1,000,000.

Conn., Avon—TELEVISION TRANSMITTER—Travelers' Broadcasting Service Corp., 17 Central Row, Hartford, television transmitter, Talcott Mountain, for WTIC-TV, $350,000. A. D. Ring & Assocs., 425 13 St. N. W., Wash., D. C., consult. engr.

Conn., Stamford—MARINA—John H. Scott-Paine, Shore Rd., Greenwich, marina at Palmer's Island and Ware Island, yacht basin docking slips. $500,000.

▲ **IOWA**—GENERATING PLANT, etc.—Eastern Iowa Light & Power Corp., Wilton Junction, generating plant and transmission facilities $10,490,000. Stanley Eng. Co., Hershey Bldg., Muscatine, consult. engr. CD 4/20/46.

Mass., Boston—PLAYGROUND—City, Frank R. Kelly, park comr., City Hall Annex, playground 8 acres Weld St. area, West Roxbury. $100,000. Bids in June.

Minn., Richfield (P. O. Minneapolis)—PARK—Village, O. R. Can Krevelen, mgr., park-playground facilities. $100,000. L. J. Jolly, village engr. Constr. in 1957.

▲ **N. J., Port Newark**—CARGO DISTRIBUTION BLDGS.—Port of New York Auth., 111 Eighth Ave., New York 11, N. Y., 4 cargo distribution bldgs. on site southwest of intersection of Tyler and Export Streets extending to Calcutta St. $4,400,000.

N. J., Thorofare—DRIVE-IN THEATER—Zeo Amusement Co., c/o Michael DcAngelis, archt., 121 N. Broad St., Phila., Pa., drive-in theater, $350,000.

N. Y., Brooklyn—BALL DIAMONDS, etc.—Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York, Zone 21, plans by Lama, Proskauer & Prober, 395 Pearl St., Zone 1, Proj. P-245, ball diamonds, rehabilitation of field house, etc., at Canarsie Beach Park, $180,000. CD 8/28/51.

N Y., Brooklyn—PLAYGROUND—Comr. Parks, Dpt. Parks, The Arsenal Bldg., Central Park, 64 St. and Fifth Ave., Zone 21, Proj. P-381, playground at Betsy Head Park, $160,000. John J. Kassner & Co., 111 Broadway, New York, Zone 6, consult.engrs. CD 8/3/49.

▲ **N. Y., Lynbrook**—RECREATION BLDG.—Village Bd., referendum vote defeated on Mar. 19, recreation bldg. and swimming pool at Greis Field on Horton Ave. $590,000. CD 3/6.

O., Cleveland—FREIGHT DOCK—City, Dpt. Port Control, Wm. J. Rogers, dir., City Hall, Zone 14, freight dock, west of W. 3 St. $1,500,000. Osborn Eng. Co., 7016 Euclid Ave., Zone 3, consult. engrs. CD 11/10/55.

† **Pennsylvania**—NIKE IMPRVS.—U. S. Eng., 2635 Abbottsford Ave., Phila., plans by Albright & Friel, Inc., 9 Penn Center Plaza, Phila., Zone 2, services in connection with the design of sewerage treatment plants for 10 Nike sites in Phila. Defense area.

▲ **Pa., Phila**—ZOO—City, Dpt. Procurement, City Hall Annex, plans by Harveson Hough, Livingston & Larson, 117 S. 17 St., zoo expansion program. $5,500,000. CD 9/24.

Tex., Brazosport — AQUARIUM — Brazosport Marine Aquarium, c/o Arnold R. Mathis, and Brazoria Co., Brazosport, marine aquarium. $100,000.

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City..... State.....

CT-L-16

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

April 9 Massachusetts — April 18 Connecticut

BUILDINGS—BA

▲ **Conn., Hamden**—SCHOOL—BA 4/15—Town, constr. Junior High School, Washington Ave. $2,400,000. Warren H. Ashley, 967 Farmington Ave., West Hartford, archt. Arthur C. Beaulieu Assoc., 2348 Whitney Ave., Hamden, engrs. CD 7/23.

BUILDINGS—LB & CA

▲ **Fusco-Amatruda Co.**, 59 Amity Rd., New Haven, Conn., Owner Builds, $3,000,000, 120,000 sq. ft. SHOPPING CENTER, STORE and OFFICE space, parking area for 1,500 vehicles, NEW HAVEN, CONN.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 9 Maryland

STREETS AND ROADS

April 16 New Jersey

▲ **New York**—BA 4/23—Bd. Water Supply, 120 Wall St., New York, Zone 5, constr. easterly portion of West Delaware Tunnel of Delaware System, comprising about 19 mi. concrete lined pressure tunnel, circular in section and 11 ft. 4 in. in finished diam; and shafts 5 to 7 (inclusive), 14 ft. in diam.; Contr. 454, 60,000 lin. ft. tunnel incl. Shaft 5 approx. 760 ft. deep, and Shaft 6, approx. 780 ft. deep located in towns of Rockland and Neversink, Sullivan Co.; Contr. 455, 42,000 lin. ft. tunnel, incl. Shaft 7, approx. 650 ft. deep and tunnel outlet located in town of Neversink, Sullivan Co. Plans deposit $5. Extended date. CD 3/8.

BUILDINGS—BA

▲ **Pa., Phila.**—SCHOOL—BA 4/24—Bd. Educ., 21 and Winter Sts., Benjamin Franklin Senior High School. $4,000,000. Thalheimer & Weitz, 1325 Walnut St., archts. Stewart G. Barnett, 505 Cooper St., Camden, N. J., engr. CD 7/10.

▲ **Pa., Royersford** — SCHOOL — BA 4/24 — Spring-Ford Joint School Bd., constr. Senior High School. $2,500,000. H. F. Everett & Assocs., 412 Hamilton St., Allentown, archts. S. W. Herring, 412 Hamilton St., Allentown, engr. CD 2/24/56.

▲ **Pa., West Chester**—PRISON—BA 4/28—Comrs. Chester Co., West Chester, county prison. $2,757,188. Baader, Young & Schultze, 1500 Walnut St., Phila., archts., Chester I. Duncan, 225 S. 15 St., Phila., engr. CD 8/14.

▲ **N. J., Livingston** — SCHOOL — BA 5/9 — Bd. Educ., Twp. of Livingston, Junior High School, Mt. Pleasant Ave. $2,500,000. Frederick Elsasser, 2013 Morris Ave., Union, archt. CD 12/20.

HEAVY CONSTRUCTION—LB & CA

▲ **John W. Ryan Constr. Co., Inc.**, 11 W. 42 St., New York, N. Y. CA Total est. $4,000,000. sewage treatment plant, BOUND BROOK, N. J. American Cynamid Co., 30 Rockefeller Plaza, New York, N. Y. CD 2/19.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg. Bids opened 3/22,

Pa.—**F. A. Canuso & Sons, Inc.**, 173 W. Roosevelt Blvd., Phila. 20, Pa. LB $4,064,596. (8 bidders) constr. 14,847 ft. divided hy. c. conc. 12 bridges, Springfield Whitemarsh and U. Dublin Twps., L.R. 782 (2), Montgomery Co.;

Pa.—**James D. Morrissey, Inc.**, 9119 Frankford Ave., Phila. 14, Pa. LB $2,413,863. (5 bidders) constr. 13,359 ft. divided hy. of c. conc. 7 bridges, Upper Dublin Twp., T.R. 309, Montgomery Co.;

Pa.—**Latrobe Road Constr. Co.**, Box 150, Latrobe, Pa. LB $2,843,071. (4 bidders) constr. 20,018 ft. c. conc., two I-beam bridges, Allentown City, Salisbury and Upper Saucon Twps., T.R. 309, Lehigh Co., LB $981,259. (6 bidders) constr. 20,540 ft. divided hy. c. conc. bit. surf. Penn and Butler Twps., TRUS 8, Butler Co.;

Pa.—**Chas. H. Fry Constr. Co.**, 1920 Cherry St., Erie, Pa. LB $364,883. (6 bidders) constr. 16,364 ft. crushed aggregate base with bit. surf. 2 concrete bridges, Amity Twp., T.R. 8, Erie Co.;

Pa.—**Slaw-Landis Paving Co., Inc.**, Rock Hill Rd., Bala-Cynwyd, Pa. LB $183,478. (11 bidders) constr. 5,827 ft. crushed aggregate base with bit. surf. Richlandtown Boro, Richland Twp., T.R. 212, Bucks Co. CD 2/28.

BUILDINGS—LB & CA

▲ **Gens-Jarboe, Inc.**, 101 Park Ave., New York 17, N. Y. CA Est. $4,000,000. 9 story HOSPITAL and alterations to existing BLDG., BROOKLYN, N. Y. Methodist Hospital of Brooklyn, 6 St. and Seventh Ave., Brooklyn, N. Y. Rogers & Butler, 219 E. 44 St., New York 17, N. Y., archts. CD 9/20/55.

▲ **Irons & Reynolds & Snare**, (joint venture), 420 Lexington Ave., New York 17, N. Y. CA Est. $15,000,000. 31 story OFFICE, 118-20 William St. and 79-81 John St., NEW YORK, N. Y. Crum-Forster, 110 William St., New York 7, N. Y. Sylvan Bien, 33 W. 46 St., New York 19, N. Y., archt. CD 11/21/55, under John Platt Realty Corp., as owner.

▲ **Sawyer & Dolfinger, Inc.**, 345 Great Neck Rd., Great Neck, N. Y. CA Est. $10,000,000. Jefferson Station SHOPPING CENTER on 10 acre site on Main St. and Center Rd., PORT JEFFERSON, N. Y. Port Jefferson Properties, Inc., c/o contractor. Joseph L. DeMarco, 170 Bethpage Rd., Farmingdale, N. Y. and Alexander R. Stavenitz, 155 E. 44 St., New York 17, N. Y., archts.

▲ **Accurate Constr. Co.**, 32 Archbridge Lane, Springfield, N. J. Separate Contracts. $1,950,000. RESIDENTIAL DEVELOPMENT, 300 units, Brick Twp., TOMS RIVER, N. J. Paul B. West, 911 N. Main St., Toms River, N. J., archt.

▲ **Barnegat Bay Estates**, 125-35 82 Rd., Kew Gardens, N. Y. Separate Contracts. $1,800,000. RESIDENTIAL DEVELOPMENT, 150 units, Fisher Blvd., TOMS RIVER, N. J. Paul B. West, 911 N. Main St., Toms River, N. J., archt.

▲ **Lindy Bros.**, 5343 Greene St., Phila., Pa. Separate Contracts. $2,500,000. RESIDENTIAL DEVELOPMENT, 128 units, LANSDALE, PA.

▲ **Howard Leister**, Croydon, Pa. Separate Contracts. $2,800,000. RESIDENTIAL DEVELOPMENT, 130 units, Eagle Rd., etc., NEWTOWN, PA.

▲ **Joseph F. Hughes & Co.**, 5 E. Franklin St., Baltimore, Md. LB $3,041,245. Dundalk SENIOR HIGH SCHOOL, Dundalk, TOWSON, MD. Baltimore Co. Bd. Educ., Aigburth Rd., Towson, Md. Bids Mar. 26. CD 3/14.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲† **Pittsburgh-DesMoines Steel Co.**, Neville Island, Pittsburgh, Pa., LB $6,724,200 Alt. No. 1: LB $4,595,600, Alt. No. 2; test section carts for Arnold Engineering Development Center, TULLAHOMA, TENN. U. S. Eng., Box 2091, Tullahoma, Tenn. Bids Mar. 21. CD 3/21.

BUILDINGS—LB & CA

▲† **D. L. Phillips Constr. Co.**, 308 W. Palmer St., Charlotte, N. C., LB $12,963,771 800-unit Capehart HOUSING, Myrtle Beach Air Force Base, IFB 36-606-57-27, MYRTLE BEACH, S. C. Procurement Officer, Myrtle Beach Air Force Base, Myrtle Beach, S. C. Bids Mar. 12. CD 1/24.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 9 Indiana — April 11 Wisconsin

STREETS AND ROADS

April 11 Wisconsin

HEAVY CONSTRUCTION—LB & CA

▲ **ILLINOIS**—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,

American Marietta Co., 101 E. Ontario St., Chicago, Ill., CA $2,899,713, Contr. PNI-4, mfg. furnishing, del. to 51 Tri-State Tollway structure sites 115,900 lin.ft. precast prestressed concrete girders and 5,545,000 lin. ft. prestressing wire. Bids Mar. 7, awarded Mar. 22. CD 3/14, under LB.

▲ **ILLINOIS**—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,

ISTHC—**S. J. Groves & Sons Co.**, 1104 W. Reynolds St., Springfield, Ill., CA $8,803,737, Contract N-7-B, grading, drainage, paving, appurtenances, precast conc. and structural steel bridges 3.53 mi. beginning E. of Elmhurst Rd. southeasterly to near Devon and Higgins Rd., Cook Co.;

ISTHC—**H. H. Mass Constr. Co.**, Algonquin, Ill., McCarthy Imprvt. Co., 602 Kahl Bldg., Davenport, Iowa, and Dillon Stone Co., Columbus Junction, Iowa, CA $3,360,714. Cont. N-4D, grading, drainage, paving, appurtenances, precast concrete bridges 4.09 mi. S of Elgin beginning near State Rte. 59 and extending easterly to near State Rte. 31, Kane Co. Bids Mar. 7, awarded Mar. 22. CD 3/12.

▲ **ILLINOIS**—Illinois State Toll Hy.Comn., 20 N. Wacker Dr., Chicago,

S. J. Groves & Sons Co., 1104 W. Reynolds St., Springfield, Ill., CA $4,538,324. Contract E-1-C, grading, drainage, paving, appurtenances precast concrete, steel bridges 5.27 mi. E. of Rt. 25 extending easterly W of Rte. 59, Kane and DuPage Counties. Bids Mar. 14, awarded Mar. 22. CD 3/20, under LB.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 11 Kansas — April 12 Minnesota

April 16, 17 Texas

STREETS AND ROADS

April 12 Minnesota — April 16, 17 Texas

▲† **Tex., Wichita Falls**—RUNWAY, etc.—BA 4/24—U. S. Eng., Box 61, Tulsa 2, Okla., runway, taxiways, aprons, overrun and blast pads, Shepherd Air Force Base, ENG-34-066-57-51. $3,000,000. CD 8/21.

BUILDINGS—BA

▲ **Colo., Denver**—HOTEL—BA 4/11—Boettcher Realty Co., Boston Bldg., 14 to 21 story annex to Brown Palace Hotel. $7,000,000. CD 10/17.

▲† **Kan., Fort Riley**—HOUSING—BA 4/11—U. S. Eng., Federal Office Bldg., Kansas City, Mo., 433 housing units (Capehart), ENG-23-028-57-72. $5,800,000. Glen Edison, 11 E. Gregory St., Kansas City, Mo., assoc. archt. Hare & Hare, 114 W. 10 St., Kansas City, Mo., archts. Harry Noble, Reliance Bldg., Kansas City, Mo., struct. engr. CD 3/11, under Commercial Bldgs.

HEAVY CONSTRUCTION—SLC

▲ **Colorado**—GENERATING PLANT—Colorado-Ute Elec. Assoc., Inc., Frank Meeker, Montrose, soon lets contract constr. steam generating plant and 165 mi. 115 kv. transmission line, Montrose Co. $10,155,000. CD 6/17.

HEAVY CONSTRUCTION—LB & CA

▲ **Westinghouse Electric Corp.**, 117 N. 13 St., Omaha, Neb. CA $3,523,300. turbine electric generator for new generating plant at Hallam, NEBRASKA. Consumers Public Power Dist., Columbus, Neb. Bids Feb. 26. CD 1/25.

▲† **Lipsett, Inc.**, Yankton, S. D. LB $4,413,851. est. $4,632,425. erecting steel towers for Utica Junction Sioux Falls transmission line, DC 4844, South Dakota; and erecting steel towers for Fargo Granite Falls transmission line, DC 4845, North Dakota and Minnesota, SOUTH DAKOTA, NORTH DAKOTA and MINNESOTA. Bureau Reclamation, Dpt. Interior, Huron, S. D. Bids Mar. 26. CD 2/6.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

April 11 Nevada — April 24, 25 California

HEAVY CONSTRUCTION—LB & CA

▲ **R. V. Lloyd**, P.O. Box 128, Coachella, Calif., LB $3,875,571, constr. Pump Delivery Pipe Line No. 3, Spec. 519, steel plate pump delivery pipe line at 5 pumping plants 6 and 10 ft. in diam., San Bernardino, and Riverside Counties, LOS ANGELES, CALIF. Metropolitan Water Dist., 306 W. 3 St., Los Angeles, Calif. Bids Mar. 22. CD 3/7.

BUILDINGS—LB & CA

▲ **University of California**, 405 Hilgard Ave., cancelled bids to have been opened Apr. 4, Clarence Dykstra RESIDENCE HALL, LOS ANGELES, CALIF. $3,000,000. CD 3/14.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 10 British Columbia

STREETS AND ROADS

April 11 Nova Scotia

BUILDINGS—BA

▲ **Ont., Ottawa**—HEADQUARTERS—BA 5/8—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., 5 story with 3 wings about 47x35 ft., each and two wings about 47x200 ft. each, rein.-con. fdn. on steel piles, structural steel frame, brick, concrete block, stone public works department headquarters bldg., Riverside Dr. $5,000,000. Hazelgrove, Lithwick, & Lambert, 575 Laurier Ave. W., archts. CD 12/5.

HEAVY CONSTRUCTION—LB & CA

▲ **Commonwealth Constr. Co. Ltd.**, 700 Taylor St., Vancouver, B. C., CA $4,034,922. CIVIC AUDITORIUM, Dunsmuir and Georgia Sts., VANCOUVER, B. C. City, City Hall, Vancouver, B. C. Bids Mar. 5, awarded Mar. 21. CD 3/19, under LB.

ALASKA

HEAVY CONSTRUCTION—LB & CA

▲† **Patti-McDonald Co.**, Anchorage, Alaska and M-B Contg. Co., Lloyd Bldg., Seattle 1, Wash. (joint venture) LB $9,753,458, est. $11,102,815, NIKE defense facilities at Elmendorf Air Force Base, ENG-57-30, ALASKA. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Mar. 26. CD 2/15.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲† **NICARAGUA**—Bureau P. Rds., Dpt. Commerce, Interm-American Hy. Office, General Services Bldg. Wash. 25, D. C.,

Thompson Cornwall, Inc., Chrysler Bldg., New York, N. Y., U.S.A. CA $4,493,410, Alt. No. 2. Proj. B-A, approx. 48 mi. hy. constr. between Sebaco and Condega. Bids Feb. 28, awarded Mar. 27. CD 3/5, under LB.

(Proposal Advertisement see pp. 155 to 157)

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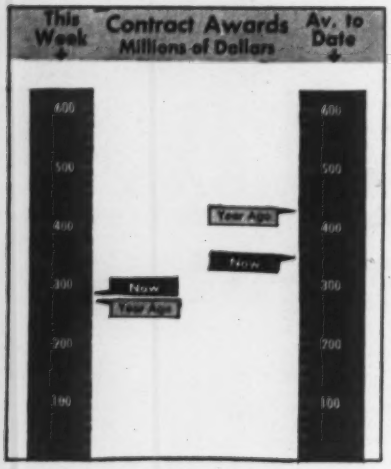
Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 14 wks 1957	Chge %
	millions		
Federal	$29.0	$739.7	+51
State and Municipal	124.9	1,834.2	+12
Total Public	153.9	2,573.9	+21
Total Private	127.6	2,274.9	−42
U. S. Total	$281.5	$4,848.8	−20
By Type of Work			
Waterworks	$6.4	$93.8	+18
Sewerage	9.0	113.2	−38
Bridges	14.3	185.1	+19
Highways	57.3	758.1	+27
Earthwork, Waterways	5.8	318.9	+71
Buildings:			
Public, Excl. Housg.	38.5	575.8	+11
Public Housing	0.5	180.0	+73
Private Housing	41.8	765.4	−55
Commercial	47.9	455.8	−20
Industrial	34.8	889.0	−38
Unclassified	25.2	513.7	+4
U. S. Total	$281.5	$4,848.8	−20

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

NEW CAPITAL FOR CONSTRUCTION

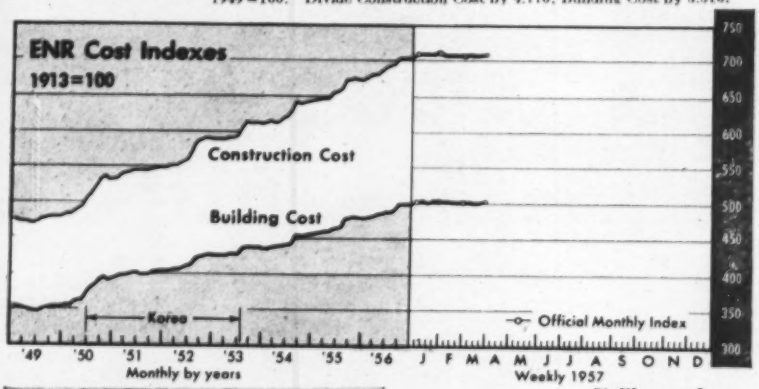
	Week of Mar. 28	Cum. 13 wks 1957	Chge '56-'57 %
	millions		
Corporate Securities	$111.6	$1,615.8	+127
State and Municipal:			
All Except Housing	122.9	1,398.1	+17
Housing	...	41.5	+104
Federal loans	4.3	36.9	+48
Federal Aid	...	....	...
Total Nonfederal	$238.7	$3,092.3	+58
Federal Appropriations:			
In U. S.	...	....	−100
Outside U. S.	...	....	...
Total New Capital	$238.7	$3,092.3	+55

Cost Indexes as of Now

ENR INDEXES (1913 = 100), 20-cities' average	Week of Mar. 28 1957	% Change from Feb. 28 1957	% Change from Mar. 29 1956
Construction Cost	709.30*	+0.1	+3.8
Building Cost	501.37*	0	+3.3

*Official Monthly Index for April, 1957

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.



WAGE RATES, 20-cities' average

	April 1957	% Change from March 1957	% Change from April 1956
Common	$2.225	+0.2	+4.8
Skilled (average 3 building trades)	3.467	+0.1	+4.5
Bricklayers	3.733	0	+4.7
Structural ironworkers	3.457	+0.1	+4.4
Carpenters	3.211	+0.3	+4.4
Equipment operators (average three types)	3.108*	+0.03**	+3.2*

* March ** February

MATERIAL PRICES, 20-cities' average

Structural Steel (average 3 mills), per cwt.	$5.000	0	+8.7
Lumber, 2x4 Fir, per M fbm	115.388	−0.4	−5.9
Lumber, 2x4 Pine, per M fbm	101.533	−0.1	−2.6
Cement, bulk, per bbl	3.904	+0.8	+5.5
Sand, per ton	2.450	0	+2.0
Ready-mixed concrete, per cu yd.	13.526	+0.2	+2.6
Gypsum sheathing, ½"x2'x8' per Msf*	62.978	+0.1	+1.7
Fiber board sheathing, ½" sq. ed, per Msf*	71.614	+0.2	+3.3
Mineral wool insulation, 3' batts, per Msf*	71.711	+0.4	−1.8
Crushed stone, 1½", per ton, CL	2.813	0	+1.7
Concrete blocks, sand gravel, 8"x8"x16", each*	0.227	0	+1.8
	March 1957	Feb. 1957	Mar. 1956
Brick, common, per M*	$37.388	0	+3.4
Lime, hydrated finishing, per ton, CL	36.093	+1.4	+6.6
Structural clay tile, 3x12x12", per M, 2000 up*	178.685	+1.6	+4.0
Vitrified clay sewer pipe, std. 12", per ft	1.313	+0.3	+7.1
Concrete sewer pipe, 12", per ft*	1.146	+2.8	+9.6

* Delivered, trucklots

ENR INDEX REVIEW

	Construction Cost		Building Cost		Volume	
1956	1913 = 100	1949 = 100	1913 = 100	1949 = 100	1913 = 100	1949 = 100
April	683.28	143.24	485.56	138.02	764	221
May	688.43	144.32	487.36	138.54	684	198
June	692.13	145.09	488.70	138.92	636	184
July	694.75	145.64	489.23	139.07	740	214
Aug	696.31	145.97	491.22	139.63	583	168
Sept	704.91	147.77	500.10	142.16	580	168
Oct	703.88	147.56	499.54	142.00	729	211
Nov	704.13	147.61	500.48	142.27	542	157
Dec	703.82	147.55	500.17	142.18	624	180
1956 Average	692.37	145.14	490.76	139.50	671	194
1957						
Jan	707.90	148.40	501.96	142.69	504	146
Feb	710.06r	148.85r	502.59r	142.87r	546	158
Mar	708.64	148.56	501.37	142.52	553	160
April	709.30	148.69	501.37	142.52	...	...

r = Revised.

Public Awards Boost March Total

Nearly all public works top February's award totals; industrial falters; commercial and housing gain

The boom in public heavy construction contracts roared through March, leaving several new records in its wake. But, a 54% February to March drop in industrial building put a chill on private awards.

Despite the downturn in private contracts, total awards increased for the second consecutive month. The March total of $1,468 million was 2% higher than February and 10% above January.

However, the weekly average volume of total contracts in March ($367 million) was 23% under the record March pace of last year when the boom was near its peak. The March contract total was the third highest on record, exceeded only by 1955 and 1956.

Total heavy construction contracts for the first quarter added up to $4,567 million, 21% under last year's booming high. But, this was still the second biggest first quarter on record.

• **Public works impressive**—During March, all major types of public works except waterworks scored big increases over February. And, for the first three months of the year, all types of public works except sewerage posted sharp gains over 1956 figures.

Most significant of the 1957 gains in the public works field have been: earthwork-irrigation-drainage, up 76%; highways, up 28%; bridges, up 17%; waterworks, up 20%; and public buildings (other than public housing), up 10%.

• **Commercial building**—March also brought two encouraging developments in the private heavy construction field. Commercial building continued its upturn for the second month and private mass housing contracts rose for the first time in five months. Housing figures still do not look big, when compared with year ago levels (March awards were less than half of the comparable 1956 volume), but, the upturn itself could be significant.

Industrial building in March was 54% lower than in February and was 61% below March 1956. This was the principal factor in the decline in private contract awards.

Unclassified private construction also was down in March. The $15 million total for the month was 87% under February and was 79% below the March 1956 level.

Costs Still Steady

Drop in lumber prices offsets new cement hikes, scattered wage boosts

Construction costs showed little overall change this month, continuing the stability that marked the first two months of the year. The reason is that declining lumber prices have been offsetting increases in portland cement prices and scattered wage increases in the 20 cities covered by the ENGINEERING NEWS-RECORD Building and Construction Cost Indexes.

The ENR 20 Cities Construction Cost Index for April has a reading of 709.30, a slight 0.1% above the March value, but under the record monthly value of 710.06 in February.

The ENGINEERING NEWS-RECORD Building Cost Index for April is exactly the same as the March value, 501.37. This also is below its monthly period

Engineering Construction Contracts—March '57

ENGINEERING NEWS-RECORD reports continental U. S. Construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation, $44,000; other public works, $73,000; industrial buildings, $93,930; other buildings, $344,000.

Four Weeks Thousands of Dollars (000 Omitted)

	March, 1957							U. S. Cumulative Three Months		% Change '56 to '57	Canada March
	New England	Middle Atlantic	South	Mid-West	West of Mississippi	Far West	Total U. S.	1957	1956		1957
Public Works											
Waterworks	663	3,248	2,809	15,178	5,206	5,361	32,465	87,498	72,875	+20	692
Sewerage	597	3,452	2,748	15,618	5,551	5,575	33,541	104,036	174,765	−40	707
Bridges	2,388	7,695	7,246	23,495	19,443	6,868	67,135	169,838	144,848	+17	2,721
Earthwork and waterways	6,773	7,571	4,868	1,399	31,189	57,704	109,504	313,315	178,446	+76	48,949
Streets and roads	13,187	32,851	38,679	53,200	66,765	26,149	230,831	700,813	547,127	+28	3,250
Public buildings, residential	6,976	2,601	47,148	846	14,829	1,966	74,366	179,368*	103,136	+74	4,401
Other public buildings	9,314	52,089	14,810	24,388	31,554	39,494	171,649	537,251	488,670	+10	5,348
Unclassified	6,493	31,609	25,597	11,253	53,080	9,413	137,445	327,800	299,506	+ 9	9,917
Total public	**46,391**	**141,116**	**143,905**	**145,377**	**227,617**	**152,530**	**856,936**	**2,419,919***	**2,009,373**	**+20**	**75,985**
Federal government (included in above classifications)	18,444	23,308	74,391	7,510	92,846	72,496	288,995	710,626*	478,368	+49	13,425
Private											
Bridges								1,220	806	+51	
Industrial buildings	4,682	38,108	32,002	20,457	42,423	24,868	162,540	854,201	1,364,427	−37	6,705
Mass housing	5,230	138,526	14,326	35,138	26,454	25,168	244,842	723,662*	1,642,213	−56	13,837
Commercial buildings	5,350	96,554	3,052	17,584	45,565	26,021	188,126	407,927	554,840	−26	20,848
Unclassified	790	563	805	2,255	9,323	1,395	15,131	160,398	181,604	−12	4,584
Total private	**16,052**	**273,751**	**50,185**	**75,434**	**123,765**	**71,452**	**610,639**	**2,147,408***	**3,743,890**	**−43**	**45,974**
Total Engineering Construction:											
March, 1957—4 weeks	**62,443**	**414,867**	**194,090**	**220,811**	**351,382**	**223,982**	**1,467,575**				**121,959**
February, 1957—4 weeks	97,428	284,258	139,166	339,815	207,814	367,563	1,436,044				150,824
March, 1956—5 weeks	163,649	828,921	176,721	395,684	422,140	392,122	2,379,237				180,606
Three Months—1957	**259,685**	**1,092,312**	**584,327**	**917,003**	**821,860**	**892,140**		**4,567,327**		**−21**	**392,465**
Three Months—1956	368,483	1,879,816	520,560	984,031	1,295,832	704,532			5,753,263		467,778
% Change '56 to '57	−30	−42	+12	−7	−37	+27					−16

*Revised. January and February Capehart military housing projects transferred from private mass housing to public residential and federal.

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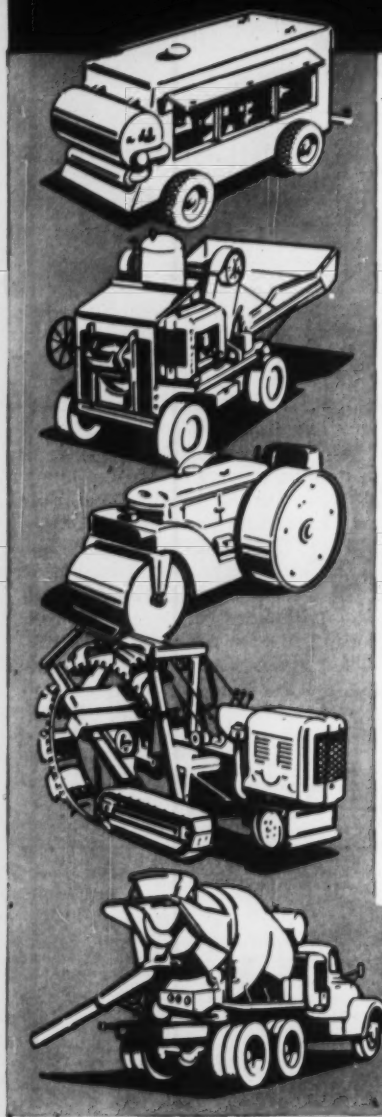

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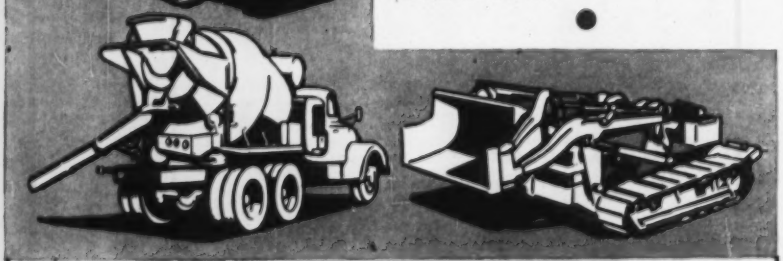
Continental Red Seals for specialized applications are available at closely-spaced power levels, in liquid-cooled and air-cooled models, for use on all standard fuels. And, strictly on the score of performance, economy and dependability, they are finding their way into more and more leading makes of road building and construction equipment for every operation from excavation on through final grading. Every Continental Red Seal is not only built for its job, but backed by parts and service facilities from coast to coast.



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high of 502.49, reached in February (1913 = 100).

• **Cement prices rise**—A 15 cents a barrel price increase for cement posted by a number of eastern mills, effective April 1, brought corresponding increases in Boston, Baltimore, New York and Philadelphia.

On the wage front, common labor received a 10 cents an hour increase in Denver, carpenters won a 20 cents an hour boost in Boston and structural ironworkers in Denver added 10 cents an hour to their pay.

But, both the cement price increases and the handful of wage boosts were offset by a net decline in lumber prices.

Denver, Kansas City and New Orleans reported lower lumber prices that more than offset price increases in Boston, Chicago, Cleveland, San Francisco and Seattle.

Because the lumber price cuts have been larger than the increases, and because increases have been for Douglas fir only in four of the five cities reporting increases, the national average for lumber has declined.

If private construction is stronger for the balance of this year (as ENR predicts), the mills should see an improvement in orders that could bring with it a modest price increase.

• **Stability could end**—From a cost standpoint, any increase in lumber prices probably would spell the end of the cost stability of the first quarter.

But, even if lumber prices hold at present levels, or decline still more, future wage increases, written into existing contracts, could easily send construction costs on their way up again—within a month or two.

Structural Steel Shipments Set New Two Month High

February shipments of fabricated structural steel ran slightly ahead of January, but dipped 2.4% below the February 1956 level, according to the American Institute of Steel Construction.

However, total shipments for the first two months of the year reached a record 540,630 tons, up 1.1% over the former January-February high of 1956.

Bookings continued to sag, the AISC reported. February tonnage booked was 265,894 tons, 19% under the record set in February 1956. Total bookings for the first two months of the year trail 1956 by 23%.

Structural steel fabricators had a backlog of more than 3.4 million tons as of Feb. 28.

(*B&F continued on page 145*)

Manufactured to comply with Federal and all state highway specifications

Wheeling Corrugated Metal Culvert Pipe withstands the torture of time and traffic – and saves highway construction dollars

It's difficult to tell exactly how long Wheeling Galvanized Corrugated Culverts will last. So often they actually outlast the road itself!

That's because Wheeling Metal Culverts can really take it! They're flexible, durable, dependable. They're stronger yet lighter. Naturally long sections are easier to handle, economical to ship and speed construction.

Wheeling Culvert Pipe or Pipe Arch, in Copper Steel or Copper-bearing pure Iron, plain galvanized or bituminous coated (with or without paved invert) comes in a wide range of gauges and diameters.

Best of all, all are immediately available – *where* you want it, *when* you want it – right from the Wheeling warehouse or Culvert Shop nearest you. For full details contact the Wheeling warehouse, Culvert Shop, or sales office nearest you.

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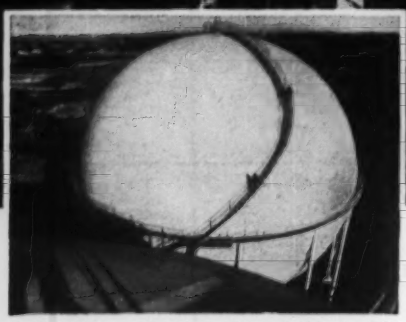
IN TOKYO, JAPAN

WORLD'S LARGEST USS "T-1" STEEL PRESSURE VESSELS

Beyond the Shinto shrine are the two USS "T-1" Steel spheres. They are being used by Tokyo Gas Works, Ltd., for the storage of natural gas at a pressure of 71.1 psi.



Lightweight construction—made possible by USS "T-1" Steel—cut shipping, handling and erection costs of these giant pressure vessels.

Thinner walls meant less weld metal required, less erection time needed. Lightweight construction also reduced amount and expense of foundation.

COMPARED TO CARBON STEEL CONSTRUCTION, the use of USS "T-1" Steel saved 1,720 tons of steel in the two giant pressure vessels pictured here. Having a diameter of 110.5 ft. each, they are the largest Hortonspheres ever built for the storage of gas. USS "T-1" Steel enabled Chicago Bridge & Iron Company to use 0.73-inch-thick shell plates rather than mild steel plates 1.75 inches thick.

USS "T-1" Steel's very high yield strength (90,000 psi minimum), plus previous experience in building non-code government vessels, permitted use of a maximum allowable working stress of 36,000 psi to which a 90% weld joint efficiency was applied. With the exception of the working stress values, the vessels were built to the ASME Code for Unfired Pressure Vessels where applicable.

In addition to saving 1,720 tons of steel, the thinner USS "T-1" Steel plates drastically lowered the cost of shipping to Japan. And each ton saved meant lower erection, welding and foundation costs. Added up, all these savings point out why the use of USS "T-1" Steel spells economy.

Shell plates were fabricated at CB&I's Greenville, Pa. plant and shipped to Tokyo for field erection. Field welding was done with E 12016 electrodes and did not require stress relief. All welds were 100% X-rayed.

Two additional vessels of similar design, but smaller in size, are now being fabricated by Chicago Bridge & Iron for installation in Tokyo.

USS "T-1" Steel is being used to improve performance and reduce costs in a wide variety of applications in steel mills, in mining equipment, in construction equipment, in materials handling equipment, in bridges, and even in steam turbines. Write for complete information about its application and fabrication. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

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UNITED STATES STEEL

Watch the **United States Steel** Hour on TV every other Wednesday (10 p.m. Eastern time).

USS

School Awards Up

First quarter contracts climb 8% over '56 level

Contract awards for public school construction, after advancing 32% from 1955 to 1956, are making still further gains this year.

During the first quarter, contract awards for public schools climbed to $269 million, up 8% over the comparable 1956 period, on the basis of reports to ENGINEERING NEWS-RECORD and CONSTRUCTION DAILY. (ENR and CD report only those school projects costing at least $344,000.)

Most sections of the nation are sharing in the drive to build new classrooms. The boom is bigger this year in all sections except two, New England and the states west of the Mississippi. New England public school awards are down 45%; the west of the Mississippi region has a 6% first quarter drop when compared with the same period in 1956.

Biggest increase to date in public school contracts is in the South. This contrasts with last year when southern school awards were going down while all other regions were going up.

The Far West shows a substantial 37% increase over the first quarter of last year. The total for the first three months of this year was $55.6 million.

The Middle West and Middle Atlantic regions both have a 19% first quarter increase over 1956. The Middle Atlantic states, leading all other areas in dollar volume, awarded $86.9 million in public school contracts in the first three months of this year. First quarter awards in the Middle West totaled $38.9 million.

Tombigbee Plan

Alabama, Mississippi may finance waterway project

Financing of the long proposed $250 million Tennessee-Tombigbee waterway development may come at the state, rather than the federal level.

Mississippi's Gov. James P. Coleman, Jr., told a meeting of Alabama municipal officials that his state is prepared to join with Alabama in financing the project if the federal government fails to provide the funds.

Gov. James E. Folsom, of Alabama, agrees with Governor Coleman that the two states could finance the project over a 50 year period at the rate of $5 million per year.

The proposed waterway system would link Gulf ports with the Tennessee River to provide a slack water route into the Middle West. The project would include a canal, principally in northeast Mississippi, to link the Tennessee River with the upper reaches of the Tombigbee River.

Governor Coleman told the municipal officials that he did not think the federal government would fail to provide the funds but added that "God helps those who help themselves, and it is definitely within reach of our two states to finance the project if that becomes necessary."

Mortgage Support

Loan authorization gives Fannie Mae bigger role

The Federal National Mortgage Assn. (Fannie Mae) has authority to pump an additional $500 million into the mortgage market as the result of a bill signed last week by the President.

The new authority came just in time. Fannie Mae has been buying mortgages from builders and lenders at the rate of about $25 million a week. Without the new law, Fannie Mae would have run out of cash by mid-April.

The new law directs the Secretary of the Treasury to buy $50 million worth of Fannie Mae's preferred stock. Under the association's charter, it is allowed to borrow up to ten times its capital and surplus, which means approval for $500 million worth of new borrowing from private investors.

• **Expect cheaper borrowing**—Fannie Mae has been making regular trips to the money market. It sold $250 million worth of debentures in January, $200 million in February and another $200 million in March.

So far, Fannie Mae hasn't had any tangible evidence of softening interest rates in its own borrowing. It paid 4.1% on the 10 month debentures sold in March, as against 4% on debentures sold in February. But, officials of the association feel they will be able to get lower interest rates on their debentures for the rest of this year.

• **Co-operatives get aid**—In the same law that increased Fannie Mae's preferred stock, the association was given authority to double its purchases of mortgages in co-operative housing projects. The first $50 million authorization in this field, made in 1955, was exhausted by the end of 1956. Now, another $50 million worth of such mortgages can be purchased.

To Complete Job

June bid opening set for Rocky Reach Dam

Chelan County Public Utility District of Wenatchee, Wash., expects to open bids in June for completion of its Rocky Reach Dam on the Columbia River. Preliminary work on the dam started in September 1956 on a provisional contract.

First stage construction of the 711,550 kw project is being financed by a $23.1 million bond issue sold last December (ENR Dec. 13, 1956, p. 79).

After the bond sale, a $12 million contract was awarded to Rocky Reach Dam Builders for stage one construction and much of the equipment required was ordered.

(Rocky Reach Dam Builders is a combine composed of Arundel Corp., L. E. Dixon Co., Hunkin-Conkey Construction Co. and American Pipe & Construction Co.)

For the equipment, Westinghouse was awarded a $16 million contract for seven generators, while S. Morgan Smith Co. was low bidder for the turbines at $11.6 million. Todd Shipyards will furnish the spillway gates under a $3 million contract.

The initial cofferdam has been completed and excavation now is under way, with placing of the first concrete scheduled for May.

Revenue bond issues totaling about $250 million will be required to complete financing for the dam, the public utility district estimates. Total financing will make Rocky Reach the largest single hydroelectric dam ever financed with private capital.

Cummins Engine Co. Reports Boost in Sales

Cummins Engine Co., a major manufacturer of power plants for construction equipment, reports that its sales for the first two months of this year are running 15% ahead of the comparable 1956 period. Earnings are up 10% on the same basis.

For the year as a whole, R. E. Huthsteiner, president, is predicting that 1957 earnings will be 10% over 1956.

Cummins also is making news with its expansion program. During the next five to seven years, the firm plans to spend $60 million to add some 625,000 sq ft of floor space, in effect, doubling its present facilities.

Last year, Cummins spent $6 million for capital improvements; this year, it will spend $12 million.

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RESISTS JET FUEL, HEAT AND BLAST

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The extreme ruggedness of Allied JET SEAL combined with its superior qualities of adhesion, cohesion, resilience and ductility at low temperatures makes it the ultimate for highway sealing. Though the initial cost of Allied JET SEAL is slightly higher it is far more economical over the long run since its expectant life is more than 250% greater than presently used materials.

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Allied JET SEAL has no cold flow tendencies even at temperatures in excess of 300°F., thereby assuring that it will remain where placed. This advanced characteristic makes it possible to seal vertical and overhead bridge joints without loss of material due to gravity flow.

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Money Bills Signed

$400 million public works program set in the State of Washington

Gov. Albert D. Rosellini has signed into law several legislative bills authorizing the expenditure of nearly $400 million for construction purposes in the State of Washington.

Largest appropriation, $301 million, is for improvement of state highways, county roads and city streets during the next two years. The bill adds more than 100 miles of roads to the state highway system.

Another bill authorizes a $75 million bond issue to speed construction of the proposed Tacoma-Seattle-Everett Freeway.

Issuance of the bonds, to be retired with funds to be received from the federal government, is expected to reduce construction time from eight to five years.

The highway bill appropriates $675,000 to study the proposed bridging of Puget Sound, west of Seattle, a tunnel through the Cascade Mountains, a new highway route through the Cascade Mountains and a bridge at the mouth of the Columbia River. Previously, $325,000 had been allotted for the study of two toll bridges, in the San Juan Islands and upstream on the Columbia River.

Another bill provides for a $3 million bond issue to complete the Echo Lake cutoff from Snoqualmie Pass highway to serve Tacoma.

Construction also is involved in an authorization for a state fair.

Cost Rise Tapers Off For Industrial Building

Industrial and commercial building costs still are rising, but not as fast as they did earlier, according to E. H. Boeckh & Associates, consulting valuation engineers.

The Boeckh index, 283.0 for February, was up 0.2% over January, and was 4.2% higher than the figure recorded for February 1956. This is based on 1926-'29 = 100.

However, the latest month to month rise is less than it was between January 1956 and February 1956, when the Boeckh index went up 0.4%.

Other evidence that the cost is tapering off is that the increase during the six months since August 1956 has been only 1.0%, as against an increase of 1.8% during the corresponding period from August 1955 to February 1956.

(*B&F continued on page 149*)

Major contractor on the approaches for the Patapsco River Tunnel in Baltimore is C. J. Langenfelder & Son, Inc. . . . now building over 15 miles of roads and ramps, including 9.3 miles of 4-lane straightaway.

Super-charged diesel – a Langenfelder D-8 "Cat"– in action on the Patapsco Tunnel Project.

C. J. Langenfelder & Son, Inc., Baltimore,

reports fewer overhauls, lower operating costs with ESTOR D-3

The Patapsco Tunnel Project is a gigantic undertaking. More than 150 pieces of Langenfelder equipment have been working on the approaches – scheduled for completion in 1957.

Because of the need for a top quality "series 3" lubricant in late model equipment, Langenfelder has standardized on Estor D-3 for *all* its diesels. As a result, Langenfelder reports: remarkable engine cleanliness that has made possible *improved engine performance and lower operating costs* due to fewer major overhauls and longer engine life.

On the Patapsco Tunnel Project Langenfelder is using *only* Esso lubricating oils and fuels. Consequently, they are enjoying smoothest possible operation...more power and fewer breakdowns.

More and more contractors are finding out that in any equipment, on any job, under any operating conditions...it pays to specify *ESSO.*

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Truly, these new roadways will be built for the future. The design standards will call for the very finest quality in the materials used . . . to withstand the pounding wear of a traffic load that is, right now, well over 600,000,000,000 vehicle-miles per year! *And, the experts say it will nearly double in the next ten years.*

As producers of the basic materials . . . crushed stone, gravel, sand and slag . . . Vulcan Materials Company, and others who combine to make up America's aggregate industry, share a tremendous responsibility.

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Vulcan Materials Company

2019 Sixth Avenue, N. Birmingham, Ala.

Thew Shovel Sales Up 33% Earnings Climb 62.7%

Net sales of the Thew Shovel Co. climbed 33.4% and net income was up 62.7% in 1956, it was reported by Chauncey B. Smythe, president.

But, Mr. Smythe thought the year could have been even better. In his report to stockholders, Mr. Smythe said: "Both sales and earnings were somewhat below those anticipated earlier in the year due to rapidly rising costs as well as unexpected slowing of sales in our industry during the last six months (of 1956)."

Mr. Smythe added that the sales slowdown in the last half of the year ". . . was particularly noticeable in the smaller sizes of machines, greater proportion of which are purchased on the installment basis and are influenced in some degree by the nationwide tightening of interest rates and credit terms."

Looking at 1957, Mr. Smythe said, "Our sales to date this year are equal to those at the same time a year ago. The new highway program is a decided influence in maintaining the upward trend of construction volume both for 1957 and the ensuing decade." He expects construction volume to advance at a rate of about 16% during the next five years. During the next four years, he sees a 60% increase in highway volume.

Construction Markets

Wilmington: An On the Spot Report

"The construction market outlook for the Wilmington, Del., area looks exceptionally good within the next four to six months, with the inflationary spiral of rising building costs looming as the only cloud on the horizon."

That view of M. O. Bader, president of J. A. Bader & Co., Inc., of Wilmington, and president of the Associated General Contractors of Delaware, is shared by most contractors, engineers, architects and bankers. They are pleased with prospects for a high volume of industrial, commercial and institutional construction. Sole exception to the rosy forecast is housing, which has been drastically curtailed.

Although housing may continue to drag its feet, other types of construction are expected to continue at a fast pace. The state is in the midst of a $44 million school construction program, for example. At least $8 million in contracts for school building will be let this year in Wilmington and an additional $10 million worth of work is under contract or up for bidding in New Castle County.

The central section of Wilmington is acquiring a new look. Work has begun on a $2.5 million remodeling of Equitable Security Trust Company's main office plus a new, adjoining 14 story building which will be the city's tallest.

Work also is progressing on a multi-level, 500 car parking building, the city's first off street parking facility, which will include a seven store commercial area. And, late in March the Wilmington Trust Co. announced plans for construction of a 10 story office building.

Industrial expansion is strong in the well-diversified Wilmington area. Delaware Power & Light Co. will spend $50 million in the next two years, and a total of $100 million in five years for expansion of facilities. Work includes a new 150,000 kw power plant at Edge Moor (still in the planning stage), completion of two power plants on Indian River and additions to the company's buildings in Wilmington.

Colorado Fuel & Iron is planning to go ahead with its proposed $33.2 million expansion at its plant in Claymont, north of Wilmington. Major construction work has been completed on Tidewater Associated Oil Co.'s new $100 million, 130,000 barrel a day refinery at Delaware City. Several Du Pont projects also are under way.

In the institutional field, several million dollar plus contracts are due to be awarded in the next few months, including one for more than $2 million for an addition to St. Francis Hospital, a large contract for a new Roman Catholic church, and a contract for more than $2 million for the Kruse School for Girls.

The public works outlook also is promising, with a variety of jobs coming along. Bids have been taken for the third, major and final phase of construction of the new Summit Bridge over the Chesapeake and Delaware Canal. New Castle County Levy Court is planning construction of miscellaneous buildings for the county engineer's office and additions to Wilmington's public buildings.

Delaware recently sold $10.7 million in various purpose state bonds. This issue consisted of $2 million for general highway construction, $2 million for surfacing dirt roads, $5.7 million for school construction and $1 million for capital improvements at public institutions, including the University of Delaware, Delaware State College and the State Welfare Home and Hospital at Smyrna.

Like many other major cities, Wilmington is suffering from traffic congestion. A controversial $35 million West Wilmington Freeway route has been approved by the State Highway Commission as one of the remedies for the traffic congestion. This proposed freeway could be the start of a state wide highway improvement program.

But, no sweeping improvements are in sight for the homebuilding segment of the Wilmington construction market. A few pertinent statistics: In 1955, there were 3,000 homes built in New Castle County; in 1956, only 2,300 were built. In January 1956, permits were issued for 334 homes. In January 1957, permits were issued for only 72. During February, the permit total dropped from 107 in 1956 to 74 in 1957. During the first 11 days of March, exactly six permits were issued for homes. Yet, in March 1956, there were 188 permits.

Heavy discounting of mortgages guaranteed by the Veterans Administration has been a major factor. Such discounts range from five to seven points.

While Wilmington (and New Castle County) homebuilders are concerned over the future of the VA home loan program, there is a new concern about conventional loans, which are not expected to take up the slack left by the decline in government insured mortgages.

One indication: Some subcontractors who usually begin spring activities at this time are looking around for "odd jobs" until building operations get under way on a broader scale.

But, aside from the homebuilding plight, Wilmington shapes up as a strong construction market throughout 1957.

Beck Stand Puts Labor on Spot

Teamster chief challenges legality of Senate probe as the AFL-CIO moves to enforce its ethical codes

Concerned that refusal of teamster president Dave Beck to testify fully on union affairs before a Senate committee could bring punitive legislation, leaders of organized labor last week took some serious steps.

The Executive Council of the American Federation of Labor and Congress of Industrial Organizations suspended teamster president Dave Beck from two high posts (vice president of the AFL-CIO and member of the Executive Council) and directed an investigation of the International Brotherhood of Teamsters.

The council's action came in the wake of a refusal by Mr. Beck to testify on teamster affairs before the Senate Select Committee on Improper Activities in the Labor-Management Field.

In a voluntary appearance before the committee, which is now investigating indications of corruption on the part of some teamster officials, Mr. Beck refused to answer questions relating to his possible misuse of teamster funds.

Fearing that Mr. Beck's stand might lead to public indictment of the whole trade union movement, leaders of the AFL-CIO called a meeting of the Executive Council last Friday and voted:

- To direct George Meany, federation and council president, to file charges against Mr. Beck "for his actions in bringing the labor movement into disrepute and for his failure to explain the charges against him."
- To direct the Ethical Practices Committee to investigate and determine whether the teamsters union, of which Mr. Beck is president, was "substantially dominated or controlled by corrupt influences."
- To instruct the Conference of Secretaries of the affiliated international unions to call in the accountants employed by these unions to try to draw up standard procedures for reporting receipts and disbursements.

The AFL-CIO investigation is expected to take nearly three weeks. The Executive Council will meet again May 20 to hear charges against Mr. Beck.

The AFL-CIO action against Mr. Beck stems from the notoriety that was attached to the teamster president's appearance before the McClellan committee, where Mr. Beck, availing himself of constitutional guarantees, refused to testify about committee assertions that he had misused more than $300,000 in union funds. Mr. Beck, flanked by legal counsel, challenged the committee's right to conduct its current investigation, and also questioned the committee's methods.

The Select Committee, headed by Senator John L. McClellan, was created last winter to resolve jurisdictional differences between the Senate Labor and Public Welfare Committee and the Permanent Investigations Subcommittee. It is authorized by Senate Resolution 74 to investigate "the extent to which criminal or other improper practices or activities are, or have been, engaged in the field of labor-management relations or in groups of employees or employers" to their detriment or to the detriment of the public interest, and to determine whether changes in law are necessary to prevent such practices. This authorization and the manner in which it is exercised have been challenged by Mr. Beck.

• Beck's position—At the hearing, Mr. Beck expressed a willingness to cooperate with the committee but not he said, at the expense of sacrificing what he regards as his legal rights. If he is to stand accused of malfeasance of a criminal nature, Mr. Beck said in effect, the proceeding should be judicial rather than legislative, and if he is to be tried for breach of trust to union members then the investigation should be conducted under authorized union procedure. In any case, he contended, the committee should not compel him to testify against himself in a non-judicial proceeding when that testimony may in the future be pertinent to matters not within the province of the committee or not related to the welfare of union members.

• AFL-CIO's problem—In giving the committee a series of legal problems that may take judicial minds some time to unravel, Mr. Beck has given the AFL-CIO quite another problem—one concerned not with Mr. Beck's legal rights but with keeping the name of the AFL-CIO above reproach.

In practical terms, it's the problem of convincing the public that all of labor is not corrupt and that the AFL-CIO is taking its own housecleaning seriously. Failure on either score may result in new restrictive and punitive legislation—on both local and federal levels—that goes beyond protecting the financial interests of union members and that might hamstring the trade union movement entirely.

On the policy level, the AFL-CIO has, since its founding, been an outspoken critic of corruption in union ranks. It has adopted rigid codes of ethics for the protection of union members and for the guidance of its affiliates, and it has initiated, with marked success, a number of investigations of its own. It has encouraged and pledged its full cooperation with legislative investigations "fairly and objectively" conducted. It has recognized the right of union members to plead the Fifth Amendment but has declared that a union official who invokes the amendment "for his personal protection" has "no right to continue to hold office in his union."

Since the AFL-CIO has no direct authority over the internal affairs of its autonomous affiliates including removal of officers, it must rely upon two rather restrictive provisions in its constitution to implement its policy.

The Executive Council may conduct a hearing against any AFL-CIO officer charged with malfeasance and report to the convention with appropriate recommendations. Or it can investigate "any and all corrupt influences" within the AFL-CIO, holding a hearing if requested. In the latter case, it can direct or recommend corrective action, or, upon a two-thirds vote, "suspend" any affiliate found "dominated, controlled or substantially influenced" by any corrupt influence. And the council's action is appealable to the convention.

Within this framework the AFL-CIO must solve its own dilemma.

(*Labor continued on page 152*)

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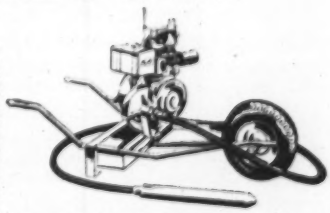

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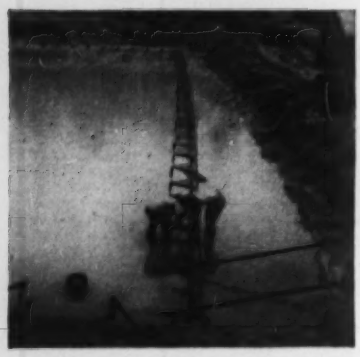
Sewage treatment plant, Clayton, N. J.
Contractor: C & T Affiliates, Inc.



SOIL on this job varied by area—fine silty sand here—coarse sand there—gravel a few feet away. This "patch-quilt" pattern precluded routine handling.

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AFL-CIO Asks Wage-Price Probe

Federation sees confused thinking over inflation and federal controls as threat to collective bargaining

A full scale Congressional investigation of the relationship between wages and prices is sought by the AFL-CIO as a means of clearing up existing "confusion"—largely generated, it believes, by the Eisenhower Adminsitration—over "inflationary" factors in the national economy.

The request comes just at the time the construction industry is moving into its 1957 collective bargaining season with new demands for wage increases. In meeting these demands, various segments of the industry already have seized upon President Eisenhower's recommendation that wage increases be reasonably related to cost-of-living and productivity increases to curb inflationary trends. The Associated General Contractors of America, Inc., for example, has officially endorsed the Eisenhower recommendation, and building contractors in New Jersey have suggested a voluntary wage-freeze "to stop the ominous threat of inflation" and to avoid "federal controls". And not far removed from the problem is a report by Pacific Northwest teamsters that "isolated employers" are already taking advantage of the current Senate investigation of labor activities to "threaten" and "browbeat" teamster locals into accepting inferior working conditions.

But to the AFL-CIO, the linking of wage increases to inflation is the result of confused thinking. In the current issue of its "Economic Trends and Outlook," the federation contends that it is a "misinformed belief" that the nation is in "the midst of a general inflationary condition". By definition, it explains, inflation exists only when there is an "excessive demand for goods in short supply." The recent 3% increase in living costs, it asserts, has stemmed not from a general inflation as the Administration contends, but from the "administered price policies" of key basic industries that enjoy the absence of price competition.

Testimony to this effect already has been presented by segments of the AFL-CIO to the Congressional Joint Economic Committee in an effort to obtain a wage-price-profit investigation, which the AFL-CIO Executive Council officially requested at its mid-winter meeting in Miami, Fla. Success, so far, has been limited to the announcement last month of Sen. Estes Kefauver, chairman of the Antitrust and Monopoly Subcommittee of the Senate Judiciary Committee, that his committee would investigate price increases in "administered price" industries, in which a few of the dominant leaders reportedly can control the price structures of their industries.

• **Prices**—Industries accused by the AFL-CIO as representing the major source of pressure on price levels include iron and steel, electrical machinery, flat glass, auto, fuel, concrete and building board.

In each of these industries, according to the AFL-CIO, prices rose variously from 8 to 20% betweeen mid-1955 and the end of 1956. And the AFL-CIO contends that this occurred despite "soft markets" for and "large inventories" of many basic items.

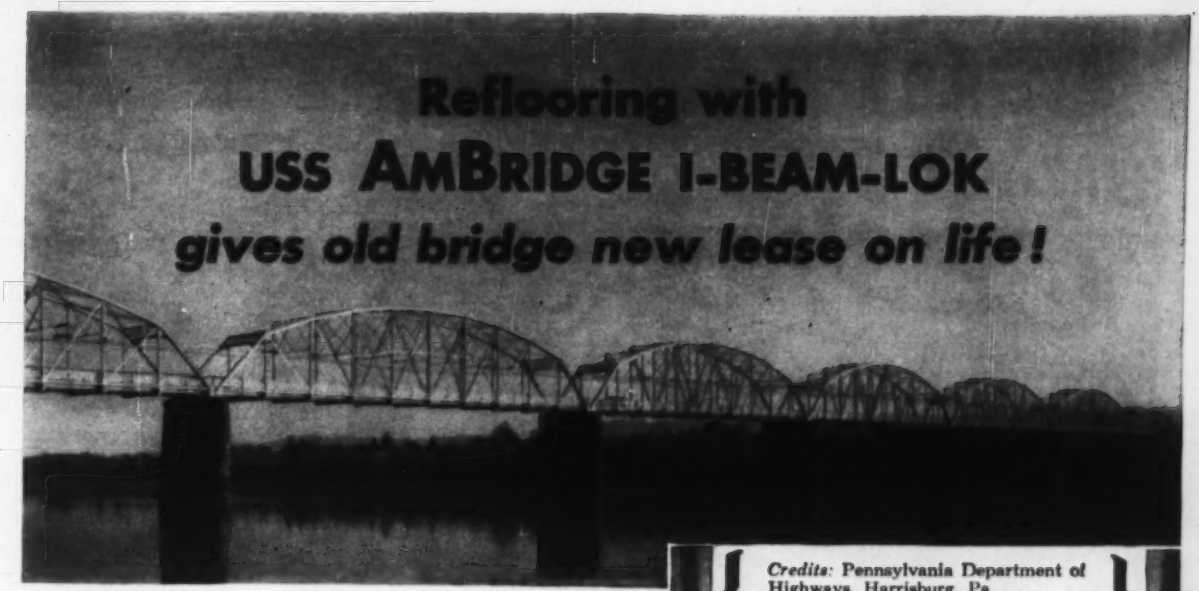
The steel industry is considered one of the prime examples of what the AFL-CIO is complaining about. Some of the figures cited by the federation are these: The industry's "after-tax" profits rose from a 12.9% "rate of return on stockholders' holdings" in the first half of 1955 to 14.9% for the first half of last year; wage increases, according to the research director of the steelworkers union, have not "caused" a single price increase in the last 20 years—but steel prices have risen "more than $3 for every $1 of increased wages and fringes granted to its employees, resulting in a "net profit—and a big one" on every wage increase.

• **Wages**—To the AFL-CIO the record shows that "prices do not rise automatically with wage increases."

Looking at the statistics for the year November, 1955-November, 1956, it reports, for example, that wholesale prices of lumber and wood products declined 2.8% while average earnings of workers producing those products rose 4.1%; textile prices declined .06% while wages rose 5.6%. But in the steel industry wholesale prices climbed 11.2% while wages rose 6.5%; and wholesale motor vehicle prices advanced 7.4% while wages went up 3.8%.

Net result, says the AFL-CIO, is that existing price pressures are "overwhelmingly unrelated" to wage increases. And it feels that this fact would be brought to public attention by a Congressional investigation.

(*Labor continued on page 155*)



Credits: Pennsylvania Department of Highways, Harrisburg, Pa.
Contractor: High Welding Company, Lancaster, Pa.; Sanford H. High, Pres.

Lightweight steel flooring increases carrying capacity of bridge.

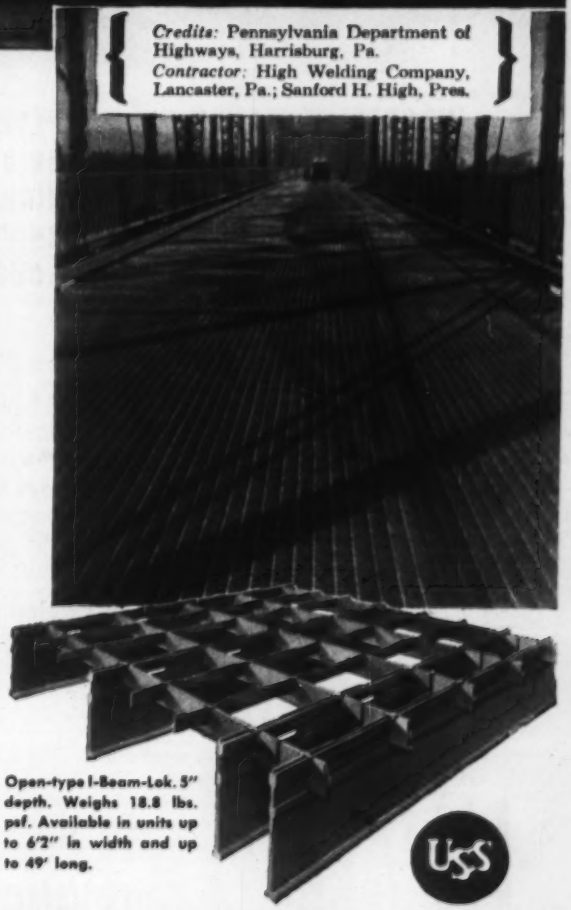
THE OLD CONCRETE DECK on the 19′-wide roadway of the 1,440′-long Mifflinville, Pa. bridge, shown above, was in such condition that further repair was impractical. The existing concrete deck, *which was only 4″ thick*, was aged and worn.

By removing the old concrete deck, adding *one* row of new stringers, and placing 27,360 sq. ft. of open I-Beam-Lok steel flooring over the full length and width of the roadway, the engineers on the project not only solved the problem of added dead weight, but actually increased the carrying capacity of the bridge. The open steel flooring also put an end to costly maintenance.

In commenting on the use of USS AmBridge I-Beam-Lok on this reflooring job, Mr. Sanford H. High, of the High Welding Company, says: "Due to the ease of handling and the accuracy of the steel flooring which was fabricated in 6′2″ units, we were able to lay it fast and keep far ahead of the schedule set up by the Pennsylvania Department of Highways, therefore reducing inconvenience to the public to a minimum."

FREE 32-PAGE BOOKLET FOR YOU

For detailed information about the time-and-money-saving advantages of this modern lightweight steel flooring for bridges, let us send you a copy of our catalog. Contains latest design data and application details. Describes both open and concrete-filled types of USS AMBRIDGE I-BEAM-LOK.



Open-type I-Beam-Lok. 5″ depth. Weighs 18.8 lbs. psf. Available in units up to 6′2″ in width and up to 49′ long.

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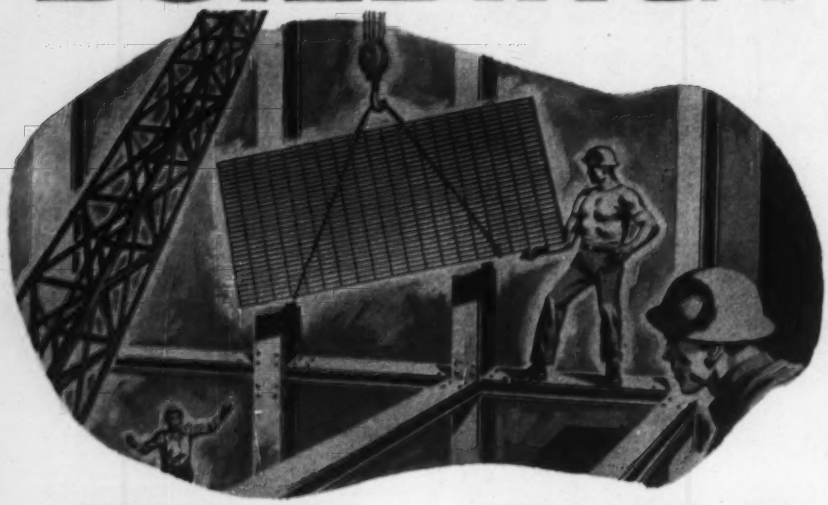

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Reactors Called Safe

Strauss of AEC points to good safety record

Atomic energy reactors have been operating for nearly 15 years with a safety record better than that of any other industry, Lewis L. Strauss told Congress last week. Mr. Strauss is chairman of the Atomic Energy Commission.

During the last several months, organized labor, through the AFL-CIO, has attempted to focus public attention on the control of reactor and radiation hazards. Under the leadership of the United Auto Workers, three unions have legally questioned issuance of a construction permit for a fast breeder reactor near Monroe, Mich., and the AFL-CIO has called attention to the need at the federal level for a rigid safety code and changes in existing workmen's compensation systems.

Mr. Strauss told the Joint Congressional Committee on Atomic Energy that the odds are 50 million to 1 against a fatality from an atomic plant explosion and that present safeguards required of private industries in the atomic field are such that only a "highly unlikely" combination of human and mechanical failures could trigger off a release of fission products from a reactor. Accidents that have taken place, he said, have been confined to research reactors. But the UAW contends, however, that the Monroe reactor is of unproven design and hence exposes the public to untold and potential hazards.

The Congressional committee is probing the merits of proposed legislation for government insurance to supplement that now available to reactor operators from private companies. Separate hearings are scheduled for radiation hazards and workmen's compensation.

Professional Engineers Ask Labor Law Amendment

The National Society of Professional Engineers has urged Congress to amend the Fair Labor Standards Act to exclude consulting engineering firms from the overtime and minimum wage provisions of the law.

In testimony before a subcommittee of the Senate Committee on Labor and Public Welfare, NSPE spokesmen earlier this month said present exemption applies only to employees working in a bona fide professional capacity and is not sufficiently broad to fulfill "the long-standing intent of Congress" that professional services be treated differently from ordinary business activities.

Application of the law to employees engaged in processes or occupations closely related or essential to the production of goods for commerce, it was noted, this led to a number of conflicting court decisions on the liability of engineering firms. Unless the law is amended to dispel the present confusion, said NSPE, it may take years of litigation and considerable expense to engineers and the government to clarify the present provisions.

An ESA Affiliate Votes To Join AFL-CIO Union

Engineers and Scientists of America, a collective bargaining organization of engineering employees, has lost one of its affiliates as a result of its rejection last year of a proposal to affiliate with the AFL-CIO.

Members of the Federation of Honeywell Engineers, which has been a member of ESA until now, have voted to join the Aircraft Division of Walter Reuther's United Automobile Workers (AFL-CIO). The vote was 579 to 116. FHE, whose membership includes nonprofessional employees, has reportedly been critical of ESA's emphasis on professional membership.

ESA, which has claimed that 85% of its members are graduate engineers, voted 46 to 4 against AFL-CIO affiliation at its national convention in Dallas, Tex., a year ago.

Labor Briefs . . .

• **Strike vote**—The U.S. Supreme Court last week agreed to review a Circuit Court decision which holds that inclusion in a labor contract of a provision forbidding a strike unless authorized by employees by secret ballot is a proper item for bargaining. NLRB had ruled employer insistence on such a clause an unfair labor practice.

• **Wage boost**—A two-year contract between Laborers Local 720, Associated General Contractors and Brick and Plastering Contractors Association gives hodcarriers in 40 major Denver brick and plastering firms a 7½ cent wage boost; plumbers and steamfitters win a 25 cent package wage increase in a one-year contract with Mechanical Contractors Association of Hartford County, Conn.

• **Welfare payments**—A federal Circuit Court of Appeals has ruled that unpaid welfare contributions due from a bankrupt employer are not "wages." Result: The bankrupt's employees cannot assert a priority claim for the unpaid amounts in bankruptcy proceedings.

OFFICIAL PROPOSALS

Bids: April 25, 1957.

Power Authority of the State of New York

BARNHART-PLATTSBURGH TRANSMISSION PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF 26 MVA THREE-WINDING TRANSFORMER
SPECIFICATION NO. PA-6-27
CONTRACT NO. TF6

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture and furnishing of one (1) 26 mva three-winding transformer and associated equipment and delivery thereof, f.o.b. cars at destination until 10:30 A.M. Eastern Standard Time on the 25th day of April, 1957, at the Authority's office, 270 Broadway, Room 1305, New York, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be received for the transformer and associated equipment and services in accordance with the bidding schedule. Installation of the transformer and associated equipment will be done by Others, but services of erecting engineers shall be provided by the manufacturer when and if required. Delivery of the transformer and associated equipment will be required June 1, 1958.

Specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts and may be inspected by prospective bidders during office hours, and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and repayment of a fee of Ten ($10.00) Dollars for initial set of Contract Documents and Five ($5.00) Dollars for each additional set, no part of which will be refunded. Two sets must be returned with each bid.

Bids will not be restricted to American manufacturers.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 10% percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
General Manager

Prequalification Date: April 10, 1957

Board of Education — Bureau of Construction

Notice Re: Prequalification Forms for Contractors

NOTICE IS HEREBY GIVEN THAT The Superintendent of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, L. I. C., New York, will receive applications for prequalification of bidders from Contractors who may wish to submit bids for the proposed hereinafter specified contracts as follows:

Borough of Brooklyn. Furnishing, delivering and installation, of Laboratory Tables and Art Room Cabinets Junior H. S. 278, Stuart and Fillmore Ave's. Furnish, deliver and install, Miscellaneous shop Equipment Erasmus Hall H. S. Flatbush and Bedford Ave's, near Church Ave.

Pre-qualification application forms will have to be secured and must be submitted to the Superintendent of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, L. I. C., New York.

Bids when advertised will be received from prequalified bidders only.

Time for submitting prequalification applications by contractors will expire on Wednesday, April 10.

WILLIAM H. CORREALE
Supt. of School Buildings,
Dated: March 20th, 1957.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.10 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record, P.O. Box 12, New York 36, N. Y.

Bids: July 3, 1957.

Aukland Metropolitan Drainage Board Manukau Sewage Purification Plant Aukland, New Zealand Contract 86

NOTICE TO TENDERERS

Tenders are invited for the construction of a sewage treatment plant at Mangere about 10 miles south of the Auckland Town Hall, Auckland, New Zealand. The work consists of the construction of a secondary type sewage treatment plant having an average capacity of 55 million Imperial gallons per day and including the following units: Screening and shredding system; grit removal system; power generating plant; reinforced concrete tanks for preaeration and sedimentation and for sludge digestion; sludge lagoons; trickling filters; oxidation pond circulation pumping station; four main steel frame brick buildings housing certain of these facilities as well as laboratories, offices, store rooms, garage and miscellaneous other rooms; together with all necessary mechanical and electrical equipment and appurtenances. The Board will furnish certain mechanical and electrical equipment, including engine-alternator units, electrical switchgear, electrical and pneumatic control equipment, certain of the pumps, air blowers, sludge removal mechanisms, bar screens, screenings grinders, trickling filter distributors, digester floating covers, air and gas compressors and overhead travelling crane, all as more specifically set out in the specifications. The work includes the installation and testing of all equipment furnished by the Board.

Drawings, specifications and bill of quantities may be obtained from the office of the Secretary, Auckland Metropolitan Drainage Board, C.P.O. Box 208, 28 Quay Street, Auckland C. 1, New Zealand, or from the office of the Board's Consulting Engineers, Brown and Caldwell, 66 Mint Street, San Francisco, California, upon payment of $150.00 which will be refunded upon receipt of a bona fide tender. In other cases, $75.00 will be refunded on return of the documents in good condition within 30 days after tender opening. Contract documents may be inspected at the offices of the Daily Pacific Builder, 465 10th Street, San Francisco, California, and at the office of Brown and Caldwell.

Tenders close with the Secretary of the Auckland Metropolitan Drainage Board at noon on Wednesday, 3 July 1957. Telegraphic tenders will be accepted provided that the completed tender is received within seven days of the closing date. Tenders must be endorsed "Tender for Contract 86" and the tenderer's name must not appear on the envelope. A deposit of £10,000 (NZ) is required with each tender.

U. S. Government

Bids: June 10, 1957

Government of Iraq Electrification of Northern Iraq Contract No. 14 Power Line Carrier Equipment

The Development Board and Ministry of Development of the Government of Iraq invite tenders from qualified firms for the supply, delivery and erection of the Power-Line Carrier Equipment for the Northern Iraq Electrical System.

Full information regarding this tender can be obtained on and after April 1, 1957 from Iraqi Embassy in Washington.

All Tender Documents are to be submitted in English to the Ministry of Development, on or before 12, noon, local time on June 10, 1957.

Minister of Development.

Bids: April 11, 1957

Delaware River Port Authority of the Commonwealth of Pennsylvania and the State of New Jersey

Administration Building
Camden, New Jersey

WALT WHITMAN BRIDGE—
CONTRACT NO. 10

Sealed bids will be received for PIER FENDERS and MISCELLANEOUS CLEAN-UP of the Main Bridge, known as Contract No. 10, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey, until 2:30 P.M., Eastern Standard Time, April 11, 1957, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of $10.00 check, which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $10,000 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialman's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the Work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO,
EXECUTIVE DIRECTOR.

Bids: April 22, 1957

Bridge Substructure and Superstructure

Sealed proposals will be received until April 22nd at 1:00 P.M. by the Chief Engineer of the Gulf, Mobile and Ohio Railroad Company, 104 St. Francis Street, Mobile, Alabama. Proposals will be opened and read publicly at the office of the Chief Engineer at that time. The work will consist of furnishing and constructing the substructure and superstructure of Bridge 216 over the Calumet Sag Channel, 22 miles South of Chicago, Ill., on a new alinement approximately 80 feet west of the present railroad. The superstructure will consist of one 324 foot double track riveted through truss span and four 30' DPG spans. The work will include construction of two reinforced concrete underpasses in the vicinity of the above bridge for access roads.

Plans and contract documents may be obtained from the Chief Engineer after payment of $35.00 for each duplicate set. No refund will be made for contract documents returned.

The work is subject to inspection and approval of both the Chief Engineer of the Railroad and the District Engineer, U. S. A., Chicago District.

Bids: April 23, 1957

West Delaware Tunnel Contracts 454 and 455

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Standard Time, on Tuesday, April 23, 1957, for the following two contracts for the construction of the easterly portion of the West Delaware Tunnel of the Delaware system, comprising about 19 miles of concrete lined pressure tunnel, circular in section and 11 feet 4 inches in finished diameter, and Shafts 5 to 7 inclusive, 14 feet in diameter, which will be circular in section and lined with concrete, all as set forth in the specifications:

CONTRACT 454, for the construction of about 60,000 linear feet of tunnel, including Shaft 5, approximately 760 feet deep, and Shaft 6, approximately 780 feet deep, located in the Towns of Rockland and Neversink, Sullivan county, New York.

CONTRACT 455, for the construction of about 42,000 linear feet of tunnel, including Shaft 7, approximately 650 feet deep, and the tunnel outlet, located in the Town of Neversink, Sullivan county, New York.

A bidder on both of these contracts may, if he so desires, specify in the bid form of either or both contracts, that he will agree to make a percentage reduction from the total cost of the contract, if both contracts are awarded to him.

Pamphlets of the two contracts containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained in the Secretary's office, Room 1312 at the above address, upon application in person or by mail, by depositing the sum of $5.00 for each pamphlet. Within 30 days following the award of contract or rejection of bids the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

U. S. Government

Bids: June 17, 1957

Government of Iraq Electrification of Basrah Power Project Contract No. (2) Steam Generators and Auxiliary Equipment

The Development Board and Ministry of Development of the Government of Iraq invite tenders from qualified firms for the supply and delivery, erection and supervision of operation of three-75 metric tons/hr. (165,000 lbs/hr.) gas and oil fired, Steam Generators and Auxiliary Equipment, for Basrah Power Project, Southern Iraq.

Full information regarding this tender can be obtained on and after March 25, 1957 from Iraqi Embassy in Washington.

All Tender Documents are to be submitted in English to the Ministry of Development, on or before 12 noon, local time, on June 17, 1957.

Minister of Development.

U. S. Government

GOVT. OF DIST. OF COL., DEPT. OF HIGHWAYS, Mch. 22, 1957. SEALED PROPOSALS will be recd. in Rm. 404, 499 Pa. Ave., N.W., Wash. 1, D. C., until 2 PM, EST, April 19, 1957, and then publicly opened and read for constr. A PRESTRESSED CONCRETE BEAM BRIDGE CARRYING SOUTHWEST FREEWAY over 4th St. at "F" St., S.W., incl. portions of approaches thereto. (Fed. Aid Project I-03-1(9), approx. quantities include 3,575 cu. yds. struct. excavation; 21,237 cu. yds. backfill and fill; 396 cu. yds. superstructure concr.; 3,048 cu. yds. substructure concrete; 26 prestressed concr. beams; 301,778 lbs. reinf. steel; 1,074 lin. ft. aluminum railing; 6,777 cu. ft. stone masonry facing. Minimum wage rates for this project have been predetermined as required by law and are set forth in the bid material. Proposal forms, plans and specns. obtainable from Supervisor, Contr. & Bond Section, Procurement Office, D. C., Rm. 406, 499 Penn. Ave. N.W., upon deposit of a certified check for $20.00 per set, payable to Collector of Taxes, D. C. (Tel. NA 8-6000, Ext. 2378).

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4884) will be received at Stockton, Kansas, until May 14, 1957, for furnishing labor and materials for Woodston Diversion Dam, Missouri River Basin Project, Kansas. Location 8 miles east of Stockton, Kansas. Principal items are 285,000 cu. yds. excavation; 69,000 cu. yds. embankment; and 3,000 cu. yds. concrete; and other work. Completion time 420 days. For particulars, address Bureau of Reclamation, P. O. Box 841, Stockton, Kansas; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Bids: April 23, 1957

Contracts 454 and 455
Notice to Bidders

NOTICE IS HEREBY GIVEN that the receipt and opening of bids on Contracts 454 and 455 have been postponed until 11:00 A.M., Eastern Standard Time, on Tuesday, April 23, 1957.

Many contractors depend entirely upon the

OFFICIAL PROPOSAL COLUMNS

of

Engineering News-Record

for Opportunities to bid.

They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts.

Make sure of them on your next contract.

The cost is only $2.10 a line per issue.

OFFICIAL PROPOSALS

Bids: April 23, 1957

City of Tampa, Florida

Sealed proposals for construction of Intercepting and Trunk Sewers, Force Main, Pumping and Ejector Stations will be received at the regular meeting place of the Board of Representatives, City Hall, Tampa, Florida, until 4:00 P.M., E.S.T., April 23, 1957, there to be publicly opened and read aloud.

The work comprises construction of the following:

Group I—INTERCEPTING AND TRUNK SEWERS AND FORCE MAINS

Division XC1—19th Street Trunk Sewer, comprising approximately 4,830 lin. ft. 18-inch, 330 lin. ft. 15-inch and 310 lin. ft. 12-inch vitrified clay pipe sewers and appurtenances.

Division XA2—East Tampa Intercepting Sewer, comprising approximately 1,750 lin. ft. 36-inch, and 5,420 lin. ft. 30-inch reinforced concrete pipe sewer and 1,435 lin. ft. 21-inch, 360 lin. ft. 15-inch and 20 lin. ft. 12-inch vitrified clay pipe sewer and appurtenances.

Division XF10—East Tampa Force Main, comprising approximately 1,005 lin. ft. 20-inch cast iron pipe.

Group II—PUMPING STATIONS AND EJECTOR STATIONS

Division XG19—East Tampa Pumping Station with two 1600 GPM and two 4500 GPM capacity vertical sewage pumps.

Division XG33—Alaska Street Ejector Station with one 200 GPM capacity duplex pneumatic sewage ejector.

Plans and Contract Documents may be examined and obtained from the offices of the Bureau of Sanitary Sewers, 6th Floor, City Hall, Tampa, Florida, and from the offices of Greeley and Hansen, Engineers, 220 South State Street, Chicago 4, Illinois. A deposit of $25.00 is required for each set of contract documents covering Group I or Group II.

CITY OF TAMPA, FLORIDA
Nick Nuccio, Mayor

Dated March 20, 1957

OFFICIAL PROPOSALS

U. S. Government

Bids: May 15, 1957

Government of Iraq
Development Board and Ministry of Development
Contract No. SPA-7(1957)
South Mosul Development

The Development Board invites tenders from Contractors experienced in such works for the land development of the Housing Scheme in Sector 2 at Mosul, Iraq.

The work includes the Construction of access and internal roads, the water supply and installations for the Electricity distribution net works.

Full information regarding this tender could be obtained from Iraqi Embassy, 2135 Wyoming Avenue N. W., Washington 8, D. C., U. S. A.

All tender documents are to be submitted to the Ministry of Development on or before 12 noon local time on May 15, 1957.

Minister of Development.

EMPLOYMENT OPPORTUNITIES

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Soils Engineer—prefer man with MS in soils about 1945 or 1946—to head up a design group in a firm of consulting engineers specializing in design of dams. Must be top-notch design engineer and supervisor. Salary open. Location Midwest. P-3942, Engineering News-Record.

Civil Engineers to work with consulting engineering firm. Long established municipal consulting firm desires to secure civil engineers for permanent positions. Experience in water and sanitation required. Offices **located in very desirable small college community in Colorado area.** Expansion of firms operations provide unlimited opportunities for advancement for properly qualified engineers. Firm desires to employ engineers with from one to fifteen years of experience. Salaries $5,100 to $6,600. Please give experience and full details in reply. Replies will be held confidential if requested. P-4371, Engineering News-Record.

Soils, Asphalt & Concrete Inspectors . . . Field & Lab Tech; also Party Chief & Instrument Man. O'seas. Mild Climate. Write Mr. Levy, Patchen & Zimmerman, 120 Greenwich St., NYC 6. REctor 2-4187.

Engineers with experience in municipal and industrial waste collection and treatment, or projects of related type. Midwest consulting firm with long established practice limited to sanitary engineering projects. Please send full details of education and experience, references and approximate salary requirements. P-4461, Engineering News-Record.

Wanted—Dirt Superintendent to work for long established Illinois Contractor, operating in Illinois, Kentucky, Missouri. Salary commensurate with experience and ability. P-4323, Engineering News-Record.

Structural Design Engineers and Graduate Civil Engineers—to design and detail buildings of all types. Excellent opportunities. Salary will depend on experience and ability. Replies will be treated confidentially. Ammann & Whitney, Milwaukee Office, 724 East Mason Street, Milwaukee, Wisconsin.

POSITIONS VACANT

Designers—Electrical and Piping . . . . . Power Plants and Industrial Buildings. Marbarry Corp., 120 Greenwich St., New York City 6, N. Y. REctor 2-3749.

Head of Testing Laboratory—Soils, Asphalt & Concrete. O'seas. Mild Climate. Call or Write Mr. Levy, Patchen & Zimmerman, 120 Greenwich St., N. Y. 6. REctor 2-4187.

Mining and Smelting Engineer. For a mature experienced man a permanent responsible position is available, with large long-established firm. Headquarters Detroit and Windsor, Ontario. Please send full resume, in confidence if requested, to P-4518, Engineering News-Record.

Structural Engineer for responsible charge of important design work, with experience in marine structures, steel fabrication practice. Salary $800 up, depending on qualifications. P-4696, Engineering News-Record.

Sanitary Engineer. Responsible designer, capable taking charge design small sewage treatment plants. Cleveland, Ohio. P-4553, Engineering News-Record.

Gunite Estimator and a Gunite Superintendent —Middle Atlantic States. State age, experience, availability, salary desired. P-4640, Engineering News-Record.

Graduate Civil Engineer or equivalent experience to assist City Engineer, location North-Central Indiana, salary $5,200-$6,500. Please give experience and full details in reply. P-4680, Engineering News-Record.

Field Engineer for a cement company. Graduate engineer, 25 to 30, eastern location, excellent opportunity. Send picture, resume of experience and salary expected. P-4651, Engineering News-Record.

Superintendent for all phases Asphalt Highway Construction in Arkansas. Hot Asphalt Plant Operation experience necessary. Position permanent. Salary open. Reply: Personnel, P. O. Box 2660, Little Rock, Arkansas.

City Engineer Wanted: general municipal engineering and administrative duties. Thoroughly experienced. Medium size growing city. Must be registered in Ohio. Salary $7800 per year. Write experience resume to Service-Safety Director, City Building, Mansfield, Ohio.

(Continued on the following page)

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

The Advertisements in this section include all employment opportunities—executive, management, technical selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities . . .
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED ——RATES—— **UNDISPLAYED**

The advertising rate is $31.80 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

$2.10 per line, minimum 3 lines. To figure payment count 5 average words as a line.
Position Wanted ads are ½ of above.
Box Numbers—counts as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.
Not subject to Agency Commission.

Send NEW ADS or inquiries to Classified Adv Div of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36, N. Y. April 18th Issue Closes April 8th

RESIDENT ENGINEER

Virginia

CIVIL ENGINEERS

With field experience for Assistant Resident Engineer and Inspectors—

Alabama & Texas

CONSTRUCTION ESTIMATORS

Virginia

Openings with Construction Division of large, expanding Manufacturing Company

Excellent Opportunities

P-4683, Engineering News-Record, Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

WANTED IMMEDIATELY

First Class Structural Engineer wanted for large fabricating plant in the Southwest, fabricating steel for mill and tier buildings and all types of highway, turnpike and expressway projects.

Applicant should be about 35-40 years old with about 15 years experience in detail drafting office. Requirements of college graduate or registered engineer are not essential provided applicant has sufficient education and experience to qualify as a registered engineer.

Excellent opportunity for advancement—Ideal working conditions in air conditioned office—Company benefits—Insurance — Hospitalization — Vacation — Retirement — Paid Holidays and Sick Leave.

Enclose complete resume of personal history, education and experience.

P-4689, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

GRADUATE CIVIL ENGINEERS or ARCHITECTURAL ENGINEERS

Major Southwestern general contractor needs engineers for work in estimating dept. Job requires investigation and take off and can also lead to field work depending on interest of employee. Excellent opportunity for young men to obtain desirable position with reliable firm doing all types of construction work. Have openings in El Paso, Dallas, and Los Angeles offices.

ROBERT E. McKEE

GENERAL CONTRACTOR, INC.

PO BOX 562 EL PASO, TEXAS

POSITIONS VACANT

(Continued from preceding page)

Wanted: Paving and dirt Superintendent for long established New York contractor operating in New York and adjacent states. Salary commensurate with experience and—ability. P-4670, Engineering News-Record.

Engineer and general foreman for construction of wharf pavillion and shark basin in foreign country. Company constructs tourist attractions in West Indies locations where immigration allowed only to company officials. State capital, if any, you can invest. J.C.M., Box 344, Nassau, Bahama Islands.

Position open for Junior College Instructor in Drafting and Engineering Drawing. Apply, Director, Coalinga College, California.

Construction Superintendent for industrial and Commercial construction by well known Pennsylvania Engineering and Constructors Organization for work in central Pennsylvania. Give full details in letter of application. P-4771, Engineering News-Record.

Superintendent experienced in excavation, pumping, sheeting and shoring methods. Opportunity to grow with expanding organization. Must be willing to travel. Permanent position with good future. P-4768, Engineering News-Record.

Sales Engineer for permanent position in fast-growing phase of heavy construction. Familiar with excavation methods and equipment. Civil engineering background desirable but not necessary. Must be willing to travel in eastern United States. Excellent future. P-4767, Engineering News-Record.

Engineer—experienced. For medium sized contracting firm engaged in heavy construction, principally highways, airports, bridges, interested in intelligent, ambitious engineer. Duties would include engineering layout for excavations, paving and structures; estimating proposed jobs; and computing quantities of work done. Would touch on all operations of company and lead to executive position for right man. Salary open. Reply by letter giving resume of education, experience and references. East. P-4762, Engineering News-Record, 520 North Michigan Avenue, Chicago 11, Illinois.

INDUSTRIAL ENGINEER

B.S. or M.S. degree industrial or Mechanical Engineering. Post graduate studies desirable, production control, tool design, material handling, industrial psychology, etc. Good knowledge and experience in techniques industrial engineering and their application to fabrication shop and office operations. Also good working knowledge machine tools and fabrication processes required. Large Copper Company Chile, South America. Salary $9,000. 3-year contract. Transportation both ways and salary while traveling paid by Company. In reply give complete details.

P-4714, Engineering News-Record, Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

HIGHWAY ENGINEERS

DESIGNERS, DRAFTSMEN, SURVEYORS

Experienced men, continuous and progressive opportunities as Project Engineers, Group and Squad Leaders. Long range Interstate and Expressway Program.

ROBERT W. LOWRY, INC.
227 Pine St. Harrisburg, Pa.

SUPERINTENDENT BUILDING CONSTRUCTION

Top flight man by growing company operating nationally. Give all pertinent data in reply including education, experience, salary, references and when available.

BLOUNT BROTHERS CONSTRUCTION CO.
P. O. Box 949 Montgomery, Ala.

POSITIONS VACANT

Highway and Bridge Engineers, Designers. Experienced, for Permanent Positions in our New York Office. Excellent Salary Plus Overtime. Air mail resume to Farkas & Barron, Consulting Engineers, 5 Beekman Street, New York 38, N. Y., or call BEekman 3-8387.

Public Works Director-Graduate Civil Engi-neer, 35 to 55 and qualified for professional registration in state to serve as Director of Public Works for midwestern city of approximatelv 100,000 population. Considerable administrative experience desired, preferably in position such as Assistant Director of Public Works in larger municipality or as Director of Public Works or City Engineer for smaller city. Work includes over-all supervision over engineering division, and such varied operations as street maintenance, garbage and refuse collection and disposal, building inspection, building and grounds maintenance, sewer maintenance, sewage treatment, etc., with a total personnel complement of approximately 175. Ability in administration and public relations more important than extensive engineering background. P-4747, Engineering News-Record, giving minimum salary acceptable.

Civil Design Engineer-To head sanitary sewer, drainage or paving section of Engineering Division in growing city of 95,000 population. Graduate and/or registered Civil Engineer desired, with considerable design experience preferably in a municipal engineering department or municipal consulting firm, to perform a variety of design duties, see to the long range planning for work in a given phase of municipal engineering and to the instigation and carring through to completion of specific projects, supervise and instruct subordinate personnel, and deal directly with the public. P-4748, Engineering News-Record.

City Engineer—Registered Civil Engineer State of Florida—Salary $6,000.00-$7,500.00 —Kindly send resume to G. F. Althouse, City Auditor and Clerk, City of Ormond Beach, Florida, P. O. Box 695. All replies confidential.

Chief of Party—Must be capable of handling survey parties and have thorough understanding of survey work pertaining to rights of way, curb and street lines, sanitary and storm sewer surveys, and general survey work. Apply by appointment—Office of Howard Madison, Township Engineer, 1 Main Street, Woodbridge, N. J., between 9 A.M. and 5 P.M.

Transit Man—For inside and outside work. Must have thorough knowledge of engineering, drafting and calculating, and be thoroughly familiar with deed and conveyance, and tax map work. Apply by appointment—Office of Howard Madison, Township Engineer, 1 Main Street, Woodbridge, N. J., between 9 A.M. and 5 P.M.

(Continued on page 161)

ENGINEERS

IMMEDIATE OPENINGS FOR FOREIGN WORK

ELECTRICAL and CIVIL

(STRUCTURAL INSPECTION, MATERIALS AND SOILS)

Needed for supervision on northern air bases at attractive salaries. Some seasonal, others one year or more. No dependents' quarters.

Submit resume stating education, experience, salary requirements and availability, or send for our application form.

Fay, Spofford & Thorndike, Inc.
Consulting Engineers
11 Beacon St., Boston 8, Mass.
Personnel Dept. Tel: LAfayette 3-8300

ENGINEERS and ARCHITECTS

You Have An Excellent Future Working For

CATERPILLAR TRACTOR CO.

THE WORLD'S LEADER

In the field of Crawler Tractors, Motor Graders, Diesel Engines, and Earthmoving Equipment.

Due to a vast expansion program opportunities exist for:

ARCHITECT: Minimum of five years experience. Staff position directing design, approval of drawings and specifications. Coordinating design of new plants or major plant additions.

STRUCTURAL ENGINEER: Three to five years experience in design of steel and reinforced concrete heavy industrial structures.

ASSISTANT SUPERVISING ENGINEER: Responsible for general supervision and coordination of contractors in the construction of new plant facilities.

FIELD ENGINEER: Responsible for concrete and soils work. Supervising proportioning, mixing, placing and finishing of concrete, performing soils and concrete tests for control.

ENGINEER OFFICE ASSISTANT: Construction responsibilities associated with distribution and evaluation of job costs, processing invoices, insurance coverage, guarantees, waivers of liens, and general clerical work.

Interested applicants are requested to send full particulars of experience and education to Mr. R. R. Hearlow, Professional Employment Co-ordinator.

EMPLOYMENT DIVISION

CATERPILLAR TRACTOR CO.

Peoria, Illinois

STRUCTURAL ENGINEER

Graduation from a college or university of recognized standing with a degree in engineering, specializing in structural engineering, and 5 years experience in a responsible capacity involving design of all sizes and classes of buildings and structures or an equivalent combination of experience and training. Salary $6136-$7436 per year.

Complete details by writing to Director of Personnel, Municipal Building, Hartford, Conn.

ENGINEERS

FOR PLANT AND EQUIPMENT DESIGN

Permanent positions on the engineering staff of this rapidly growing company are now open for mechanical, civil, electrical and chemical engineers with two to ten years experience.

Duties will consist of process equipment design and project engineering.

Location: Memphis, Tennessee

In addition to a good starting salary, there are many attractive employee benefits including profit sharing and hospitalization insurance.

Send resume to:

Technical Division, Personnel

The Buckeye Cellulose Corporation

Memphis, Tennessee

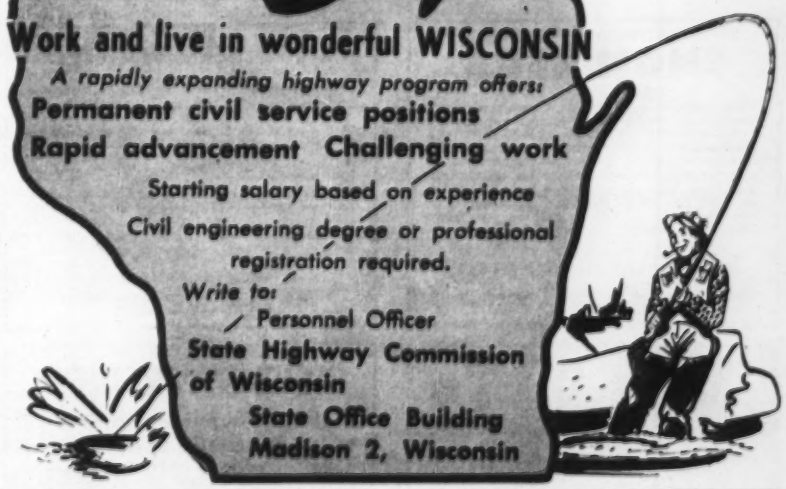
CIVIL *Engineers*

Work and live in wonderful WISCONSIN

A rapidly expanding highway program offers:

Permanent civil service positions
Rapid advancement Challenging work
Starting salary based on experience
Civil engineering degree or professional registration required.

Write to:
Personnel Officer
State Highway Commission of Wisconsin
State Office Building
Madison 2, Wisconsin



SUPERINTENDENT

Must be expert in Heavy Construction, Bridges, Foundations, and Cofer-dams. Permanent position with old established New Jersey Contractor on projects in New Jersey, Maryland and Eastern Penna. Minimum travel required.

Reply **P-4716**, Engineering News-Record, Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

SALES ENGINEERS

A major steel company has need for sales engineers to promote and sell fabricated products in middle Atlantic states. Excellent opportunities for men 25 to 30 years old with engineering background and a desire for sales work. Attractive starting salary with company car, expenses and bonus plan.

SW-4684, Engineering News-Record, Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

OPPORTUNITY FOR YOUNG GRADUATE ENGINEERS

WITH

Sverdrup & Parcel Engineering Co.

1134 LOCUST ST. ST. LOUIS 1, MO.

Additional Openings for

DESIGNERS **DETAILERS**

Overseas Openings Available For Engineers 30 to 45
With Extensive Experience In Highway Engineering

WORK AND ADVANCE IN PROFESSION OF HIGHWAY ENGINEERING WITH HIGHLY SKILLED ASSOCIATES IN A GOOD PLACE TO WORK. PERMANENT POSITIONS FOR QUALIFIED MEN. PERIODICAL REVIEWS OF SALARY. LIBERAL EMPLOYMENT BENEFITS, RETIREMENT AND INSURANCE PLANS.

Please Write Fully to Above Address

HIGHWAY ENGINEERS for work in New Jersey and New York

Designers, draftsmen, chiefs of party, specification writers — submit complete resume stating education, experience, salary desired and date of availability to

P-4561, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

BRIDGE & HIGHWAY ENGINEERS DRAFTSMEN

BROOKHART & TYO

Consulting Engineers

3501 N. Front St. Harrisburg, Pa.

Highway & Bridge Engineers Designers & Draftsmen

Career opportunities for men interested in professional recognition. Excellent working conditions and employee benefits including liberal retirement program.

Openings in Pennsylvania, Maryland, Florida, West Virginia, Mississippi and overseas.

Air Mail Resume TO R. L. SHAW, *Personnel Director*

MICHAEL BAKER, Jr., INC.

BAKER BLDG. *Consulting Engineers* ROCHESTER, PA.

EXPERIENCED HYDRAULICS ENGINEER WANTED

Graduate engineer experienced in paper mill hydraulics, planning and development of piping layout systems, etc. for large expanding and progressive mill in Maryland. Good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland

BRIDGE & HIGHWAY

Designers, draftsmen, tracers, inspectors. Several permanent positions open with excellent opportunities.

FRANK L. EHASZ, CONSULTING ENGINEER
40-29 27th St. Long Island City 1, N. Y.

ENGINEERS

Long established firm of consulting engineers with world-wide practice needs both beginners and experienced civil, electrical, mechanical, and foundation engineers for interesting work on large dams, powerplants, and river control works. Permanent positions. Liberal employee benefits. Starting salaries dependent on qualifications. Please send complete resume to Hugo Niemi, Personnel Manager.

HARZA ENGINEERING CO.

400 W. Madison St. Chicago 6, Ill.

ENGINEERS WANTED

Power Plant and Paper Mill Piping Estimator
Industrial Building Construction Estimator

Both must be able to make complete lump sum bid estimates, as well as handling contracts as project engineer after contracts awarded (buying, expediting, customer contracts, etc.). Will be based in Atlanta area.

Also Field Piping Engineers for work located in Southeastern states making material takeoffs, sketching pipe fabrication, etc. on paper mill and power plant jobs.

Apply by letter only to:

JAMES H. KAMINER
Kaminer Construction Corporation
Box 227, Chamblee, Ga.

YOUR ORGANIZATION

Is it complete?
Are you expanding it?
Making Replacements?

Naturally, you are anxious to secure the most suitable man or men available. You want men with the special training that will make them an asset to your organization. You can contact such men through an advertisement in this Employment Opportunities Section of ENGINEERING NEWS-RECORD.

Classified Advertising Division

ENGINEERING NEWS-RECORD

P. O. Box 12 New York 36, N. Y.

CONSTRUCTION . . .
PROJECT MANAGER
PROJECT ENGINEER

For overseas project

Should have engineering degree plus extensive experience as project manager or project engineer on overseas installations.

Must be available on 30 days notice. Husband & wife quarters. Salary commensurate with background.

Send complete resume

P-4663—Eng. News-Record
Class Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

HIGHWAY ENGINEER

Highway Engineer with 8 to 12 years experience in design and administration. Must be able to assume heavy responsibility. Excellent opportunity with established consulting engineering firm in Middle West. Must be registered.

P-4635, Engineering News-Record,
520 N. Michigan Ave., Chicago 11, Ill.

POSITIONS VACANT
(Continued from page 158)

Assistant port engineer, growing Florida seaport. Must be C.E. graduate or equivalent and have four years experience in design and construction of port or municipal facilities. Salary range, $6,000-$7,200 plus benefits. Send experience record and references to Port Engineer, Broward County Port Authority, Port Everglades Station, Fort Lauderdale, Florida.

Designer—draftsmen with several years experience in the design of sewage treatment plants, pumping stations and related structures. Excellent opportunity with growing firm in City in Upstate New York. Salary commensurate with ability. Paid vacations, holidays, hospitalization. Our employees know of this ad. P-4729, Engineering News-Record.

Electrical Engineer II—position in Baltimore, Maryland with State Dept. of Public Improvements. College degree in electrical engineering, and three years' experience in design or installation of electrical equipment. Starting salary $5533. Contact State Commissioner of Personnel, 31 Light St., Baltimore 2, Md. by April 30th.

Opportunity for graduate Civil Engineer. Assistant Professorship—development and teaching in new two-year technological program at a Midwestern State College. 10 months contract. Position open September, 1957. Reply: James F. Hall, Dean, Collegiate Technical Division, Ferris Institute, Big Rapids, Michigan.

Architectural Engineer: Degree in Architectural, Mechanical or Civil Engineering, plus three years supervisory experience in construction. Experience may be substituted for degree. Functions primarily technical and administrative, rather than on-the-job supervision or inspection of construction. Starting salary $7,000 annually. Excellent company benefits. Contact Charles R. Brown, Land Clearance and St. Louis Housing Authority, 2031 Olive Street, St. Louis 3, Missouri.

SELLING OPPORTUNITY OFFERED

Flooring Agents wanted: Detroit auto stamping mill now making steel anchor floor plates. Widely used by industry. Exclusive territories. Write on your letterhead. RW-4622, Engineering News-Record.

POSITIONS WANTED

Project Manager-Superintendent, Heavy & bridge construction, 19 years experience. $200. PW-4332, Engineering News-Record.

Superintendent or Construction Manager: Thoroughly experienced in handling all types of projects from the bidding to the completion stage. Will go anywhere. Available immediately. PW-4543, Engineering News-Record.

Maintenance Superintendent. Heavy Earth-moving & Paving Equipment. Preventive Maintenance organizing and administration. 15 years experience. Presently engaged midwest. Desires change to far west or west coast. PW-4517, Engineering News-Record.

Project Manager or Chief Estimator 25 yrs. experience in all phases of Industrial, Commercial and Institutional work including Gov't. Contracts. Location—Texas, Arizona, Louisiana preferred. Age 53—Permanent—Excellent References. PW-4602, Engineering News-Record.

Building Const. Field Supt: Industrial, com-mercial, institutional, churches, etc. Similar position in field desired. 25 years exp. can travel. Age 55. PW-4645, Engineering News-Record.

Civil Engineer, BSCE, age 27. Desires posi-tion as structural engineer with consulting engineer in Florida. Able to analyze indeterminate structures. LTJG returning to civilian status after 3 years in Navy Civil Engineer Corps. PW-4652, Engineering News-Record.

Tunnel Superintendent: 22 years experience excavation and concrete, including underground powerhouse. Available May 1st. Excellent following, speak Spanish, go anywhere. PW-4667, Engineering News-Record.

Crew of Engrs. & Draftsmen—Elec. Mech. Civil—completing 18 mo. petro-chem plant design. Available individually or as group. Box 2004, Borger, Texas.

Young Graduate Engineer B.S. Arch. E. de-sires field position on building construction with general contractor. Three years construction contract experience as a Navy CEC officer. One years experience as structural designer and draftsman. PW-4671, Engineering News-Record.

POSITIONS WANTED

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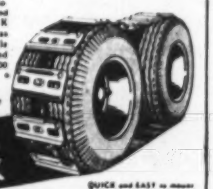

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Plastic Design to the Fore

INTEREST in plastic design of structural steel is growing at a rapid rate. This is attested by the large attendance at conferences held recently in various cities to present the techniques that have been developed for this method. As a result it is reasonable to conclude that as soon as design rules can be prepared and written into building codes, the plastic theory will take its place as an accepted design tool alongside elastic methods.

The basic concepts are presented in an article on p. 38 in this issue, in which the theory is applied to continuous beams and one-story frames. A comparison of the computations for plastic design with those for solutions by the elastic theory will show that plastic design is much simpler. But more important, it makes possible designs with consistent safety factors, and presents an opportunity to cut steel costs.

The savings are as likely to occur in fabrication and erection as in a reduction of steel quantities since plastic design permits efficient use of constant-section members, such as rolled beams, in continuous construction. In contrast, design by the elastic theory often requires heavier sections at the supports of continuous beams than at midspan.

Application of the plastic theory is limited currently to statically loaded, continuous, one-story steel frames because multistory frames, and structures with moving loads, present some problems that have not yet been solved satisfactorily. However, since a substantial proportion of the rolled beams produced annually now go into one-story buildings, this limitation will not impair seriously the usefulness of the new design tool. In any event, it is advantageous to start with simpler structures and loading conditions until the new techniques are thoroughly understood and widely mastered in practice.

Perhaps the most novel of the basic concepts involved in plastic design is the formation of "plastic" hinges at points of peak bending moment before failure occurs. (Tests at Lehigh University have confirmed this phenomenon.) These hinges convert continuous beams and frames into statically determinate structures, capable of carrying even more load after the hinges form. The limit load is reached when just enough hinges develop so that the structure becomes a "mechanism"—that is, it deforms freely without increase in load.

If structures designed by the plastic theory are to behave as predicted, designers must make certain that all the assumptions on which the theory is based are fulfilled. Principally, they must design structures to prevent early failure due to buckling. For example, knees of rigid frames and other sections where plastic hinges might form should be braced adequately laterally. Also the plastic theory should not be applied to structures subjected to impact loads or consisting of members that are expected to carry relatively large axial loads.

The American Institute of Steel Construction will probably have its design recommendations ready for discussion sometime this summer. After that, it should not be long before designers will be wielding this new tool as readily and effectively as the older ones.

Better Break for Highways

LESS COSTLY BRIDGES over many navigable waterways are in prospect if Congress acts favorably on a bill (S. 1149) recently introduced by Senator Dennis Chavez.

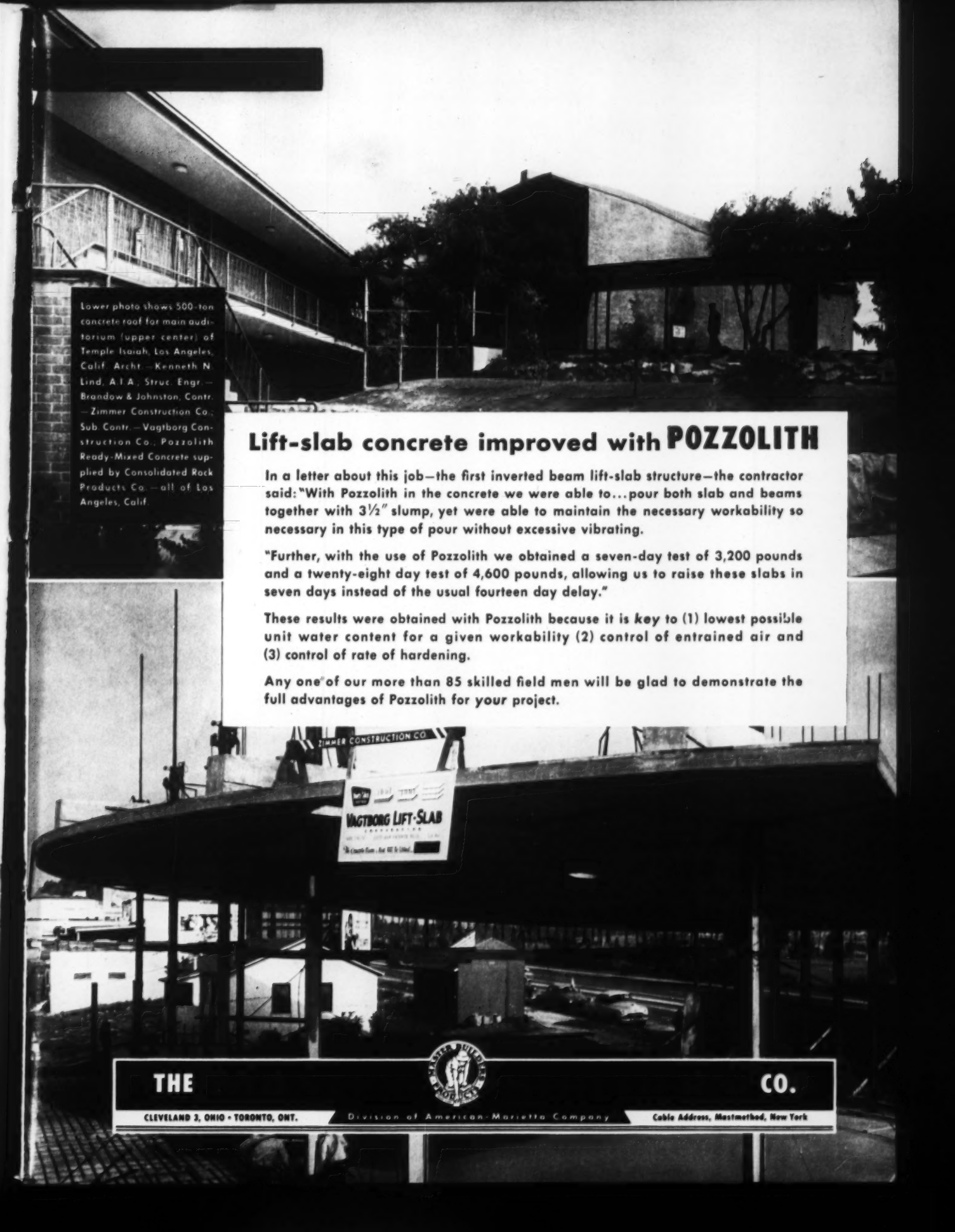
The present law requires that in approving plans for highway or railway bridges over such streams, the Secretary of the Army and the Chief of Engineers must "protect the interests of public navigation." Traditionally, traffic on our inland waterways—which were the vital arteries of commerce in the early days of the nation—has been given preference over land traffic. Unfortunately, the tradition continued to be honored long after railways and highways also became major carriers of commerce.

The most costly aspect of this policy appears when it is applied to minor waterways and to streams that once had been navigable or were navigable in theory if not in actual practice. In the past, railway companies and highway departments have been required to build costly movable bridges over minor waterways, some of which have almost never been opened. Also, the navigation interests frequently called for unduly high clearances over a waterway when fixed spans were being considered.

The sad part of the case is that the law does not seem to give the Army Engineers much choice. They have to "protect the interests of public navigation." There is no requirement that an attempt be made to weigh the cost to the highway or railway against the benefits to be obtained from meeting the requirements set up by the navigation interests.

All this could be revised under the changes proposed by Senator Chavez. In approving plans for bridges over navigable streams, the Army Engineers would be required to recognize the equal rights of all forms of surface transportation (highway, railroad, waterway and pipeline). Also, they would have to consider how the navigation clearance as well as any conditions relating to bridge maintenance and operation would affect all forms of surface transportation.

Such a change would be very welcome. And it could not come at a better time, because many bridges over navigable streams are to be rebuilt or replaced as part of the expanded highway-building program inaugurated last year. Planning for a replacement bridge will offer an opportunity to review the requirements for channel widths and clearances in the light of current traffic on the water. The end result ought to be large savings in the cost of many new bridges.



Lower photo shows 500-ton concrete roof for main auditorium (upper center) of Temple Isaiah, Los Angeles, Calif. Archt.—Kenneth N. Lind, A.I.A.; Struc. Engr.—Brandow & Johnston; Contr.—Zimmer Construction Co.; Sub. Contr.—Vagtborg Construction Co.; Pozzolith Ready-Mixed Concrete supplied by Consolidated Rock Products Co.—all of Los Angeles, Calif.

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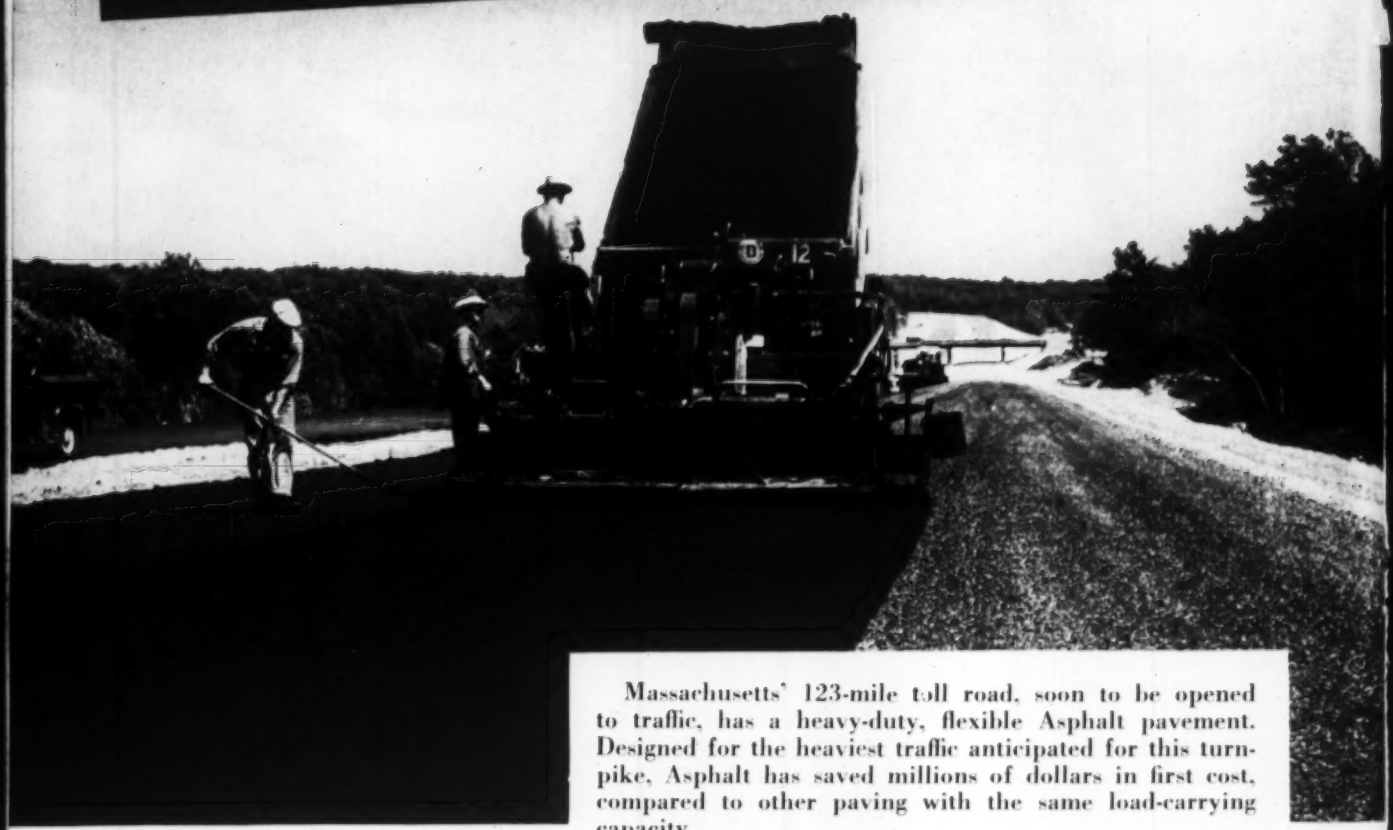

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